AMERICAN GAS ASSOCIATION MONTHLY

What's on Tap for the A. G. A. Convention?

An Improved Gas Broiler Is Developed by A. G. A. Research
By ALEXANDER FORWARD

The Story of a Big Business
By JOHN J. McGRATH and FELIX B. STREYCKMANS

Status of the Investigation of Pipe Line Protection Against Corrosion

More Manufacturers Plan to Exhibit

Salesman's Compensation—How We Do It
By R. G. MUNROE

A Simplified Iodine Pentoxide Apparatus
By F. E. VANDAVEER and R. C. GREGG

Statistical Data on Gas Industry for First Five Months of 1929
By PAUL RYAN

August, 1929

Volume XI
Number 8

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AMERICAN GAS ASSOCIATION MONTHLY

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Volume XI AUGUST, 1929 Number 8

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October
14-18
Atlantic City,
N. J.

The Time and Place of the A. G. A. CONVENTION

Plan Now to Be There Then

The Association does not hold itself responsible for statements and opinions contained in papers and discussions appearing herein.

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Our Own Who's Who

LI

FLOYD W. PARSONS

BORN January 23, 1880, Keyser, West Virginia. Educated in West Virginia public schools, University of West Virginia, and Lehigh University. Received degree of engineer of mines (E.M.) in 1902 from Lehigh University. Started as surveyor in mines. Was district engineer for the Lehigh Valley Coal Co., Wilkes-Barre, Pa.; division engineer, Consolidation Coal Co., Fairmont, W. Va., and Frostburg, Md.; chief engineer, Stonewall Coal Co. and New River Consolidated Coal Co., Thurmond, W. Va.; chief engineer, Victor American Fuel Co., and Colorado and Southeastern Railroad, Denver, Colo.

Leaving the field of active engineering and mining operations, he became assistant professor of mining in the Michigan College of Mines, Houghton, Mich. After a year of teaching, Mr. Parsons became associate editor of the "Engineering and Mining Journal" in New York City. In 1909, he founded and was the first editor of the "Coal Age." During the War he assisted Dr. Harry A. Garfield, United States Fuel Administrator. Was also a member of Commission of American Journalists invited by British and French Governments to visit those countries during the World War.

In the meantime, his articles commenced to appear in the more popular magazines as well as the technical press. At the end of the War, he became the author of the department called "Everybody's Business" in the "Saturday Evening Post." Three years later he became identified with the gas industry through an association with Merton C. Robbins, and is now editorial director of the "Gas Age-Record," "Industrial Gas," and "Gas Appliance Merchandising." Is an officer or director of a number of corporations both in the publishing and the manufacturing fields. Also is author of business books, and a regular contributor to "The Saturday Evening Post," in addition to his syndicated feature in trade journals.

Has long been identified with the work of the American Gas Association, and has addressed many meetings and conventions. Is extremely interested in smoke abatement work.

AMERICAN GAS ASSOCIATION MONTHLY

VOLUME XI AUGUST, 1929 NUMBER 8

What's on Tap for the A. G. A. Convention?

IN August, the question of prime importance for all gas men is "What's on Tap for the A. G. A. Convention?" All are eagerly looking forward to the 11th annual convention and exhibition, which will be held in the new auditorium at Atlantic City, N. J., October 14-18.

Night view of Atlantic City auditorium—Scene of A. G. A. convention

This year the A. G. A. will meet under ideal conditions. The new auditorium at Atlantic City is especially constructed to house the exhibition and meetings, and the committees and individuals in charge of the A. G. A. meet are taking all necessary steps to insure a well-handled convention. It will be a pleasure to attend this convention!

While it is too early to divulge anything but a skeleton of the convention, it is known that the exhibition of appliances and equipment will be the largest ever held, and that due provision is being made to allow sufficient time for close inspection of the exhibits. Elsewhere in this issue is given a list of the exhibitors.

The program for the general sessions, always of great interest to the gas men, is rapidly assuming definite shape, and the announcement to be made in the September issue of the MONTHLY will reveal a program containing the names of many prominent men who will speak on subjects of real importance. General sessions will be held, as in the past, on Tuesday, Wednesday, and Thursday mornings. The evening session of the convention will be held Wednesday P.M., Oct. 16, and will consist of two addresses and entertainment of a high order. This session will be broadcast over one of the nation-wide networks of the National Broadcasting Company. The speaker of the evening will be a national figure, and his message will be an important one.

As in the past, the entertainment features of the convention will be little short of perfect. An orchestra of widely known reputation has been contracted for, and in addition there will be exceptional vocal talent. The ladies' entertainment will follow the lines of previous years. The Thursday evening function will be a fancy dress dance. Those who do not desire to supply their own costumes will be able to rent them from a company located in the convention hall. There will be prizes awarded for the most beautiful, most original and most unique costumes, both ladies and gentlemen. Detailed announcement of all entertainment features will

Night view of Atlantic City's famous boardwalk and hotels

be given in the September issue of the MONTHLY.

All sections and departments of the American Gas Association are planning to hold valuable and interesting sessions at the convention. These afternoon meetings are extremely important to the gas men, as they afford ample opportunity for detailed study of the various problems facing the industry.

The afternoon meetings of convention week have been cut down to allow for more time at the exhibit. The following is the arrangement for the meetings:

Natural Gas Department—Will meet on Wednesday afternoon.

Industrial Gas Section—Will meet on Wednesday and Thursday afternoons.

Accounting Section—Will meet on Wednesday and Thursday afternoons.

Manufacturers Section—Will meet on Monday afternoon.

Technical Section—Will meet on Tuesday, Wednesday, and Thursday afternoons, but will start at three o'clock to allow time for inspection of exhibits.

Commercial Section—Will meet on Tuesday and Wednesday afternoons.

Publicity and Advertising Section—Will meet on Tuesday and Thursday afternoons.

"What's on Tap for the A. G. A. Convention?" will be answered in full in the September issue of the MONTHLY. Plan now to attend, and take part in the national convention of the organized gas industry of North America! Six thousand gas men will be there!

Food Preservation Work Deserves Support

THERE will be a National Food Preservation Month, September, 1929, sponsored by The National Food Preservation Council, and a definite program has been arranged, the sole purpose of which "is to teach the Nation that proper preservation of perishable food is only attained by keeping it in a constant temperature of 50 degrees or less." The specific aims of the movement will be to sell these four major thoughts to the American public:

1. The relationship of health and food spoilage. 2. To establish in the public mind the neecssity for keeping perishable foods below 50 degrees. 3. The causes of food decay and bacteria growth. 4. The vital need for proper all year refrigeration.

The national program has been financed. The local program will be carried on by local interests whose national bodies have cooperated in the national program. The local activities have not been financed.

Companies selling gas refrigeration will receive great benefits from this national campaign and greater benefits if they will tie in with the regional movement in their window displays, newspaper advertising, distribution of booklets, placing banners on trucks, distribution of thermometer emblems of the campaign and of milk bottle jackets announcing the program and other operations that may be suggested by the national council or devised by the local councils.

Further details can be secured from the American Gas Association, which is participating in the movement.

The Story of a Big Business

By
JOHN J. McGRATH
and
FELIX B. STREYCKMANS

1 2 3 4

THE Peoples Gas Light and Coke Company, of Chicago, Ill., has produced a new illustrated lecture which appeals strongly to the MONTHLY as being the first to get over a real public relations story in an interesting and entirely understandable way.

The magnitude of a gas company's facilities and operations, and the complexity of its problems, are spectacularly and graphically portrayed.

The talk and pictures are given here, not only as an aid to any other companies which might be contemplating such a venture, but also because there are several analogies drawn which we believe are entirely new.

The numbers in the text correspond to those on the pictures and indicate which view is being shown as the text which follows is given.—THE EDITOR.

MANY customers of a gas company have an idea that they buy of us nothing but gas—may not realize that they are getting a *service,* not just a commodity.

(1) City water service is a comparable service. It is paid for in taxes or otherwise, yet the commodity, water, usually costs nothing. Here is Chicago's water supply—plenty of it, always available at all times and free; yet the water itself costs nothing. But without water *service,* it is not practicably usable; 3,000,000 people cannot go to the lake with pails whenever water is needed.

(2) This is the beginning of Chicago water service—an intake crib miles out in Lake Michigan. Cribs, tunnels, and other expensive facilities are necessary to bring the water inland, and pumping stations, machinery, and other equipment distribute water to all parts of the city.

(3) Here the water is available at the turn of a faucet. Just so with gas service. Chicago has no free and limitless supply of gas, but even if it had, the gas would be generally unusable if it were not made available when, where, and how it is wanted.

(4) The bottle shown contains the same kind of gas you burn in your gas range at home. But it must be made available before it is worth anything to a customer. Delivering the gas to more than 860,000 customers through millions of outlets throughout a city of 200 square miles of area is the big engineering job of the gas company—and a big part of operating costs.

(5) When the Army and Navy football teams played at Soldier's Field, a record crowd—110,000 people—watched the contest. Soldier's Field would have to be filled seven times, and still thousands would be outside the gates, to approximate the number of Chicago customers who have gas delivered when and where they want it, ready for use.

But to get the complete picture of the community served, you must consider these 860,000 customers, not as individuals, but as households (mostly) where two, three, four, and five or more individuals receive gas service through one "customer."

We will see now something of the problems involved in the manufacture and delivery of gas.

(6) This is our main gas plant at Crawford Avenue and 35th Street, where 65,000,-

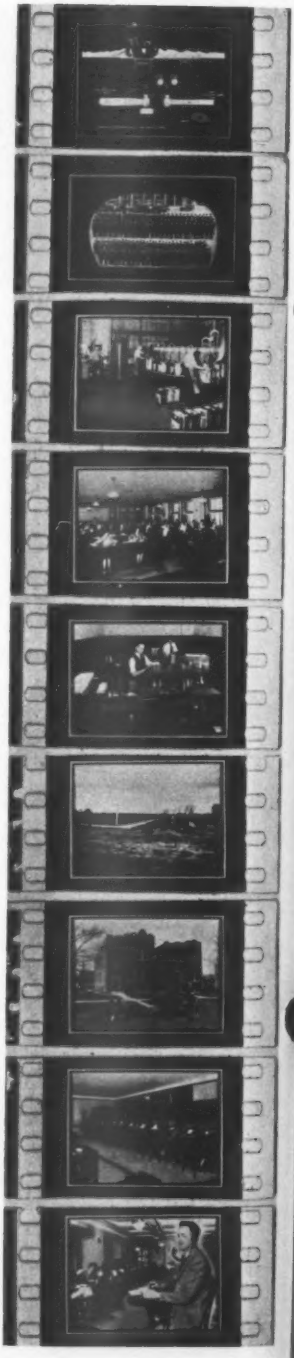
Mr. McGrath and Mr. Streyckmans are with The Peoples Gas Light and Coke Co., Chicago, Ill.

000 cubic feet of gas can be made every twenty-four hours—enough gas at this one plant to supply the city of Peoria for thirty days. That calls for an enormous amount of equipment and raw material —coal, coke, and oil.

(7) This picture shows 41,000 tons of coal—only enough for eighteen days of gas making at Crawford Avenue. The company has seven other plants, although not all of them are in operation all of the time. It has to have in reserve enough gas-making facilities to meet emergencies of any kind, as when a cold wave suddenly increases the demand for gas.

The plants and equipment for meeting these emergencies and extraordinary demands have to be provided in advance and maintained the year 'round, even though they may be used only a day or so in the year. This building for the future—anticipating the needs of a growing population and the increasing use of gas—is one gas company problem.

Another problem is that of having gas ready for you at the time of day when it is most wanted. (8) This hour comes between five and six o'clock in the evening when all Chicago



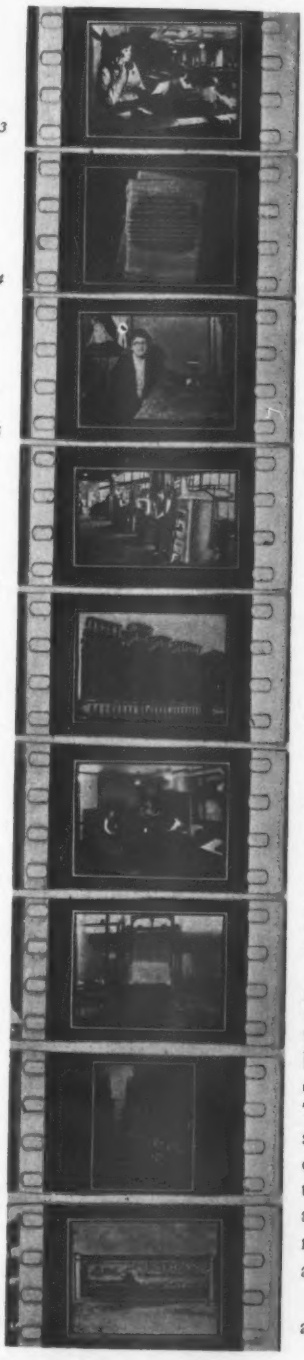
is hungry and hurrying home to supper—or *dinner*—cooked with gas. (9) In that hour, hundreds of thousands of gas ranges distributed over 200 square miles of area—hundreds to a city block—all begin drawing upon the gas supply at about the same time for cooking the evening meal. Gas service must be ready at the burner for all of them at the same time.

(10) The load dispatcher has to see that the gas supply is equitably distributed throughout the city to meet those fluctuations. Seated before his map of the city, with every transmission main plainly marked, he issues the orders to the distribution stations to fill this holder and draw upon that one, so that customers in every part of the city may have gas when and where it is wanted—all at even pressure as the demands shift.

The area you see here is only ten miles square, but the load dispatcher's map includes the entire city.

To meet the high demand of peak hours, gas is stored, during the low-demand hours of each day, in holders. (11) This one at 73rd Street and Central Park Avenue happens to be the largest in the world. It will hold 20,000,000 cubic feet of gas—enough to supply Bloomington, Ill., for thirty days. Other holders provide a total storage capacity of 128,000,000 cubic feet.

(12) Long stretches of



gas main are necessary to carry the supply of gas from one end of the city to the other, as it is needed. This one, four feet in diameter, is the longest main of its diameter in the world—37 miles.

(13) Smaller mains, connected to the forty-eight inch main, spread out like giant arteries to make a transmission system for sending gas to various parts of the city. Still smaller mains run through every street and service pipes lead from them into residences, etc., and these make the delivery system. Gas is the only commodity that is stored by and at the expense of the manufacturer for delivery automatically, instantaneously, and at the point of use, simply by turning a valve—you don't even have to order it.

(14) To send gas long distances quickly, pressure is necessary. Every customer must have a good supply of gas at the burner, no matter how far from the source of supply. Vaults like this house the pressure control apparatus. Here the pressure at which the gas flows through the big transmission main is cut down automatically. The gas then flows into the smaller mains and into individual service pipes to the premises of customers at the proper pressure for metering and for use in appliances.

(15) We have to read about 900,000 meters every

month because the amount of gas consumed is measured on the customer's premises. Public utility commodities are the only ones measured this way. The grocery store has one scale on which to weigh the sugar, coffee, and other commodities for all of its customers. The gas company provides a measuring device for each customer—nearly 1,000,000 in Chicago. The grocery would have to charge much more if it had to provide a scale for every customer.

For meter reading, a large force of trained men is required. Accuracy counts in this work and, on the whole, it is accurately done. Five of our meter readers went through the year 1928, reading more than a half million meters, without making a single mistake.

But accuracy in *reading* meters is not enough. (16) The Illinois Commerce Commission, the regulatory body of the state, requires a standard of accuracy in the registration of all meters and these men at our meter shop make sure of this and so confirm the recent statement of the United States Bureau of Standards that the gas meter is one of the most accurate of measuring devices.

(17) An enormous amount of detail is involved in billing the hundreds of thousands of customers for the gas they use each month. Last year it cost over $2,000,000 to place gas bills in the homes of our customers. In this big room of the billing division, specially constructed with a noise-proof ceiling to deaden the sound of machines, experienced operators compute the bills and from here they are sent to the bookkeeping division where more than 860,000 individual customers' accounts are kept.

Just about ten million bills were handled last year and there are ten operations in the handling of each bill, each operation an opportunity for error—and "to err is human." Yet the proportion of errors which actually occurred was only five one-thousandths of one per cent.

(18) Delivering gas bills to customers is another big job. To expedite this detail of the service, we have machines which insert the bills, *Gas Gazettes*, and other enclosures in the envelopes—work formerly done by hand. Mechanical fingers accurately insert the bills and enclosure at a daily rate of 20,000 per machine.

All this is incidental to billing the customer. Other phases of the business involve a tremendous amount of work long before we have the customer's name on our books. (19) We have to anticipate the customer's requirements and we help him plan for the future. Experienced men watch the growth of the city, having in mind public improvements. We lay gas mains and make ready for service pipes to the future customer's premises, usually long before building is considered. (20) When the builder or owner knows gas is to be used in the building, the service pipe is run and all is then ready for the customer's request for a meter, which any customer may have merely by telephoning Wabash 6000.

(21) This switchboard force of experienced telephone operators has handled and completed as many as 20,000 calls on busy days—3000 of them in one hour. The all-year average is 10,000 calls a day—more than 3,000,000 a year—and the switchboard is on duty twenty-four hours a day. The telephone operators take all calls and relay them to the other departments.

(22) The customers' order department gets from the switchboard all the calls for service—for turn-on or shut-off of the gas supply, for meter installations, for adjustment of appliances, etc.,—several thousands a day. Many of these calls necessitate reference to files which hold complete information about every meter and the status of every service order.

(23) The telephone order taker, shown in the previous picture, can talk to this file clerk while holding the customer on the wire, which eliminates the necessity of transferring the customer to another wire.

These employees are especially busy in the moving seasons. Every year nearly half the population of Chicago packs up and moves. During the seven or eight days of the May moving peak, nearly 60,000 shut-off and turn-on orders have to be executed. About 25,000 customers ask to have the gas service

(Continued on page 510)

An Improved Gas Broiler Is Developed by A. G. A. Research

By ALEXANDER FORWARD

THE first real improvement in heating heavy duty broilers for use in hotels, restaurants, clubs, etc., has been developed and recently perfected through research sponsored by the American Gas Association, and is in the nature of a radiant surface heater. With this type of burner an incandescent refractory slab projects a solid sheet of radiant heat of 1500 deg. F. down onto the food, thus affording the fastest heat transfer known. This radiant heat has a penetrating quality which cooks the food 25 per cent faster than any other known method without burning and thereby preserves the vitamins and retains the juices, permits prompter service to patrons, effects a reduction in fuel consumption and operating costs, and puts gas in the ascendancy over charcoal and electricity in both efficiency and cost.

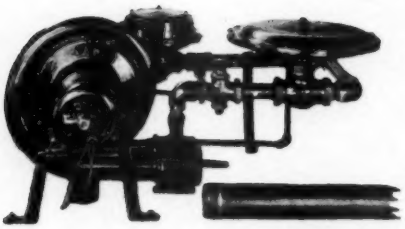
Type of oven in which the new broiler is used

This broiler is the simplest one to operate now known, as the entire control is centered in a single switch which can be snapped on or off at will. For this reason the service required by kitchen employees and by gas company service men is reduced to a minimum. Furthermore, freedom from maintenance and repairs is practically accomplished.

This radiant surface burner was developed through a program of research covering a period of years by the American Gas Association in cooperation with the Surface Combustion Company and the Standard Gas Equipment Corp. The principle embodied is entirely new for radiant heat is produced on the face of a porous refractory slab which sits in a shallow cast iron box. The gas is forced through this slab and lights on the exposed face which it quickly brings up to incandescence thus producing a radiant bed of fire like that produced by a charcoal fire. The advantages, however, lie in the fact that the heat from this burner can be projected down onto the food and can be had almost instantly and at all times by the simple snapping on of a switch. It also does away with charcoal and ash handling, fire building and tending, etc.

This radiant slab *projects* heat in any direction it faces, and has an operating temperature on the grid of approximately 1300 deg. F. Contrast this with the heat from an atmospheric burner which has a temperature of only about 750 deg. F. on the grid and which rises where it should project downward. The electric unit tries to throw heat in sufficient volume but fails and its cost is excessive.

Many gas companies have been able to secure all of the cooking load in large hotels, clubs, etc., with the exception of heavy duty broiling, where charcoal, principally, and electricity, to some extent, have been looked upon with favor. Where large gas broilers have been used, trouble has been experienced from two sources: First lazy flames hard to



Gas blower and valve assembly

keep in adjustment, and second the burning out of the burner ports causing partial closure. This resulted in excessive gas consumption and maintenance, poor service to customers, and a large number of service calls on the part of the gas companies.

In fact, the hotel and restaurant departments of many gas companies consider atmospheric burners in heavy duty gas broilers among the most troublesome of any burners on their lines.

From the standpoint of the chef the chief trouble with an atmospheric burner broiler lies in the fact that the heat rises and only a small portion of it flows down on the food. This is why a radiant burner that *projects* a large volume of penetrating heat down, or in any way directed, is an outstanding contribution to the mechanics of cooking.

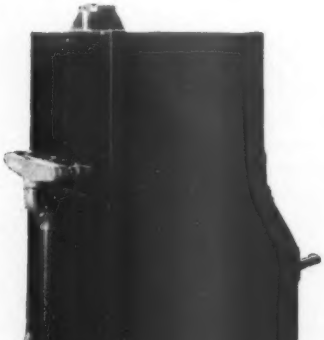
In order to increase the area of the radiant surface, the refractory slab is corrugated, which more than doubles the surface of radiation. This radiant heat has a peculiarly penetrating quality, which, together with the higher temperature, broils meats 25 per cent faster than any other known method and without burning.

The correct ratio of gas and air for perfect and complete combustion is mixed in a separate unit consisting of a blower and diaphragm gas valve. Air, which is boosted to two inches pressure by the blower, and gas, which has been dropped from line to the same pressure, are mixed in the manifold serving the burners. As pilot lights are furnished with the burners, they are lighted by simply turning the switch controlling the blower motor. Air pressure created by the blower is by-passed to the diaphragm causing it to open the valve in the gas line and starting the flow of gas which is immediately ignited on the face of the burner slab. Conversely, when the switch is turned off, or if the electric current fails, the stopping of the blower releases the pressure on the diaphragm which automatically shuts off the gas supply. This one-switch control makes this unit the simplest broiler to operate known.

With this mixing unit there is no chance for change in the gas-air mixture which would result in temperature variation and fluctuation in cooking speed. Furthermore, warpage, burning, and soot accumulation on the burners, causing disintegration and partial closure of the burner ports necessitating frequent burner replacement, are eliminated.

The entire broiler in which these units operate is about five feet high and two and a half feet square. It is constructed of heavy sheet metal and cast iron and the mixing unit is entirely enclosed in the bottom compartment. The oven occupies the center portion with the burners, three in number, located close to the top and facing down. These burners are 19 inches long, 4 inches wide and 3¾ inches from the back of the cast iron

(Continued on page 503)



Back of oven, showing method of supplying gas to the radiant surface burner

Standardization Work of Gas Industry Wins Praise

PUBLICATION of a 300-page book entitled "Industrial Standardization" by the National Industrial Conference Board is of particular interest to the gas industry. In the chapter on "trade association standardization," the work of the American Gas Association is mentioned at length, the reference inferring that the gas industry has shown great progress along the lines of standardization.

The following paragraphs are quoted from this new book:

"The American Gas Association centralizes its standardization work in its Cleveland Testing Laboratory, organized in 1925 for the object of setting up basic requirements for safe operation, economical performance and reasonably durable construction of the appliances manufactured by its membership.

"The significance of this step for the gas industry is very great. It has been estimated that there are 52,000,000 actual consumers using gas in 'about 9,800,000 ranges, 3,400,000 water heaters, 4,400,000 space heaters, and hundreds of thousands of central house heating installations, not to mention other appliances.' The gas industry is meeting strenuous competition from the oil, wood, coal and electric heating units and appliances, and from oil and electric cooking and lighting appliances.

"The difficulties to be overcome in this industry are about as great as might be imagined in any field. '. . . there are no less than 244 manufacturers of gas ranges in the United States and 141 manufacturers of space heaters. There are, furthermore, thirty-six plants turning out central house heating units, and about fifty manufacturers of miscellaneous appliances. Altogether, the number of manufacturers reaches 570, and the total number of different models or types of appliances is 10,000 and more."[1] Added to these are the occasional 'flyers,' those who come into the business to make money out of a particular appliance, and then leave.

"There is much confusion, also, with respect to the types of gas delivered to the consumer in different parts of the country. 'There are about two thousand gas companies in the United States serving a large number of different qualities of gases at various pressures. The terms Natural, Mixed, Oil, Coke, Coke Oven, and Carburetted Water Gas are only general and do not indicate the number of different qualities of gases supplied in each group. In fact it is rather difficult to find two gases which possess exactly the same constituents. Changes in pressure, specific gravity and heat content all have a decided influence on the operation of appliances.'

"In face of these difficulties and the fact that 'gas ranges, for example, must successfully pass more than 160 tests, 90 per cent of which are to insure appliance safety,' the association reported 'more than 5000 models of gas ranges approved as of August 1, 1927.'

"Appliance specifications are under the charge of the General Specifications Committee, representing 'the manufactured and natural gas industries, the Bureau of Standards, Bureau of Mines, U. S. Public Health Service, and the Master Plumbers' Association.' "

In the research work underlying the forming of these specifications, the committee collaborates very closely with the Bureau of Standards. In the formulation of standards affecting other industries, and in the development of gas safety codes, it works in a sponsor capacity under the American Standards Association procedure.

"When the specifications have been worked out, they are printed and sent to all gas companies and manufacturers who are members of the American Gas Association for criticism and approval. Following approval, the specifications are binding upon the membership within a year after acceptance. Upon acceptance of the specifications, appliances are submitted to the laboratory for tests. The successful issue of the test entitles the manufacturer to use the Laboratory Approval Seal and to advertise his product as an approved appliance.

"The Certificate of Approval held by the manufacturer from the Testing Laboratory is good for one year only. The following year all appliances must be again submitted to the laboratory for test of deviation from the standard. The laboratory does not issue disapproval lists but confines its activities to approval.

"No completely accurate data are to be had upon the degree of adherence to the Association

standards. Once the label is given, it stands for the succeeding year as an association guarantee, and it is taken for granted that its specifications are followed. Nor is there any accurate gage of the percentage of the total industry included in the work of the association. Certainly it is increasing steadily."

Ladies' Home Journal Mentions A. G. A. Laboratory

IN an article entitled "The New Era in Housework" in the June issue of the **Ladies' Home Journal,** Gove Hambich pays tribute to the gas industry's movement toward standardization for the benefit of the customer.

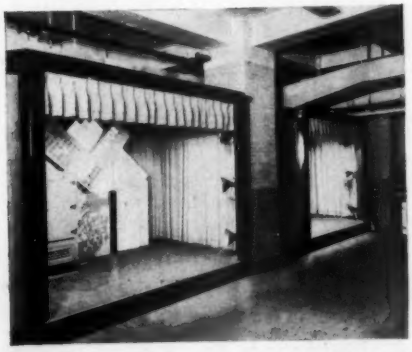
The reference to the gas industry is as follows:

"The gas industry has already pioneered in this sort of standardization, for very simple economic reasons. Your gas company customarily installs and services any gas appliances you use in your house. If anything goes wrong with the appliance, it means money out of the company's pocket. Therefore the American Gas Association maintains a laboratory in which appplianes made by a host of manufacturers are tested down to the last little bolt and nut. Every appliance that meets the Association's standards is given its seal of approval."

The article in general deals with the emancipation of the housewife as a result of research and experiment on the part of industry. Other paragraphs of interest are:

"Two young engineers working in the laboratory of a Scandinavian university succeeded in overcoming certain difficulties that stood in the way of refrigeration by gas. Now gas machines are on the market, noiseless, economical, with only a small gas flame, a refrigerating chemical and a material to absorb it.

"Automatic temperature control was essential in industry; now it is domesticated, and mercury switches and heat-sensitive metal diaphragms relieve thousands of housewives of millions of trips downstairs to tend the furnace."



Three of these illustrations show the display studio of the Consolidated Gas Co. of N. Y., and the other shows a company window display typical of the results of the studio. Ray M. Martin, director of display for the company, states that five original and complete displays are created a week, necessitating the latest in equipment and machinery

German Gas and Water Association Meets

By C. GEORGE SEGELER

THE seventieth annual meeting of the German gas organizations was held in the Zoological Gardens in Berlin from June 10 to 13, 1929. Under the able leadership of President H. Schutte, some 2500 delegates assembled for the largest gas meeting ever held in Europe. Not only was the attendance large from German companies, but there were 18 foreign nations represented.

Entrance piece at the world-famed Gas and Water Exhibition held in Berlin, Germany

At the formal opening of the sessions, Dr. Ellison, of the Union Syndical du Gaz en France, as spokesman for the foreign nations, congratulated the Germans on the success of the convention and particularly on the excellence of the Exposition of Gas and Water. The first days of the convention were devoted to gas, while the last day was given over to the problems of the water works.

Besides the technical endeavors, the convention gave ample opportunity for the delegates to meet each other over many a stein of good beer while they discussed in detail the various problems which arose during the last year. Chief among these was the question of protection against the catastrophic cold which caused so much breakage of gas main systems particularly in the larger sizes of welded steel pipe. Chief engineer Rodde, of Stettin, read a most instructive paper on commercial types of gas detectors and indicators. He said: "In a hundred years of German gas experience our main systems have suffered no such destructive frosts as in the past winter of 1928-1929." Dr. H. Bunte stated that efforts should be made to devise ways and means whereby gas leaks can be detected in their earliest stages. The presence of gas should be determined in ways independent of the sense of smell because the odor of gas can so easily be changed by accidental circumstance or concealed in other smells.

The methods discussed by Mr. Rodde include "palladium chloride paper strips" which, together with the very earliest method of gas detection, the use of the human nose, comprise the two ways used since the beginning of the gas industry. The Berlin newspapers seized the "smell" method and gave a great deal of publicity to the supposed use of special employees for gas leak smelling.

The report continues with discussions of failure to smell gas either because of fatigue or because the gas has filtered through the ground so that the smell has been absorbed. The latter is indicated as being due to traces of mercaptans or phenols. Similarly, leaks in rooms cause such slow increases in concentration that fatigue of the smell sense hides the presence of gas. Similar smells are produced by sewer gas, auto exhaust, carbide plants, wood impregnating, varnish and dye works, etc.

Methods which might also be used could make use of:

1. Chemical properties
2. Physical properties
   a. Gas pressure
   b. Specific gravity
   c. Electrical resistance

These are developed in the following commercial apparatus:

AN official representative of the American Gas Association at the German Gas and Water Convention was A. P. Brill, of the Ruud Manufacturing Co., Pittsburgh, Pa.

Mr. Brill, upon his return from Europe, stated that he was greatly impressed with the size and excellence of the exhibition. In addition to striking displays of all kinds of gas appliances, there was a model gas plant that was technically perfect in every detail, Mr. Brill said.

In Mr. Brill's opinion there was a splendid representation of gas men and the public at the exhibition.

(1) Vacuum apparatus—Nestler-Lahr; designed to suck gas as much as 150 feet so that it can be detected by the "palladium chloride" or other method.

(2) Vacuum Apparatus—Graf; also a suction device with a hollow staff that can be used to explore between floors or in walls. A pump and rubber hose bring the concentrated air gas mixtures to a convenient container for further analyses.

(3) Gas meter as indicating device that leakage is taking place provided that such small quantities would be registered. A meter with a slight sound during operation has been suggested.

(4) Diffusion apparatus—a number of different makes on the market making use of specific gravity diffusion and partial pressures made by —Loffler, Strache, Vienna; Joens & Co., Dusseldorf; Schuenke, Bielefeld; Vulcan Works, Gutersloh a W.

(5) Electrical apparatus—Gas searcher made by Siemens and Halske, Vienna. This is an apparatus paralleling the Bureau of Standards work on thermal conductivity. Similar equipment designed by Dr. Bohme, Vienna.

(6) Apparatus for methane—Wetterlicht, made by company for Nautical Instruments, Kiel. This device forces the gas to penetrate three Davy screens inside of the last of which is a platinum wire attached to crystals of gold. The measurement is made electrically.

Another paper on analytical methods was presented by Dr. A. Schneider of the Gas Institute, Karlsruhe. This discussed the accuracy of measuring: 1. B.t.u. value with various makes of calorimeters; 2. Specific gravity by Lux scales, Edwards balance, etc; 3. H_2S by means of lead acetate paper; 4. Ammonia by absorption in n/10 sulphuric acid; 5. Oxygen by Bunte burette, Lubberger's method, and a newer recommended method by Dr. Funk, Neukalln, Berlin; 6. Naphthaline by a modified Knoblauch method passing the ammonia free gas through picric acid solution and then titrate with n/10 KOH.

The other sessions included papers by Dr. R. Nuebling on "The Status of Gas Rates," a report of chemical-technical division of the Berlin City Gas Works on "Investigation of Coals for Small and Large Works," by Dr. W. Bertelsmann, and a paper, most important for the German gas industry in view of the disastrous experiences of last winter, on "Studies of Methods for Prevention of Leakage Losses from Gas Mains," by A. Schaefer, of Ingolstadt.

The paper by Dr. Neubling on gas rates is unusual in its significance because the gas prices in Germany are adjusted so that the revenues form a considerable portion of the income of the municipalities. In this way the purchase of gas becomes one of the most important methods of paying indirect taxes, a form of tax levy very common in Europe. Even where the gas companies are not directly city property, it is quite common to find practically all of the stock except the director's qualifying shares deposited in the city treasury. In distinction to American rate making practice, the German rates are usually "flat," and only occasionally block rates. A good many special rates exist for specific uses.

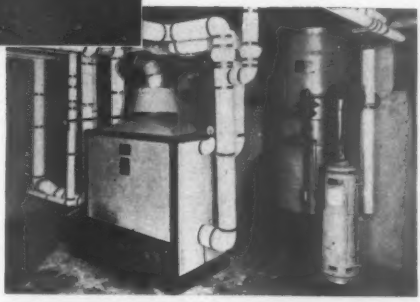
Dr. Neubling's paper analyzes the existing rates in Germany as follows: Of 779 gas works the biggest percentage—about 50 per cent—have rates between 17 and 22 pfennig per cu.ft. meter of 4300 caloric gas, which in our units would be between $1.10 per M and $1.50 per M of 450 B.t.u. gas. Considering that the purchasing power of German money is greater than the direct gold equivalent in American money, these rates are extremely high. They correspond practically to rates at least 75 per cent higher than the actual figures indicate.

What Is the Status of House Heating?

By

E. D. MILENER

Gas for house heating—no other fuel service is comparable!



LET us consider the typical American home in the first stages of its development. Wherever it was located, there were six extremely important services upon which it depended largely for its existence. These six services were somewhat alike, because the rendering of each one required extensive storage of some material in or about the home, in addition to the daily handling of this material. These included:

Water—Stored in wells or cisterns and conveyed by pumping or carrying in buckets.

Cooking—Wood or coal stored in quantities and fire kindled for each meal.

Lighting—Oil stored in large cans, with lamps "trimmed" every day.

Hot water—Wood or coal stored and fire made from time to time.

Refrigeration — Ice bought daily and chopped into small pieces as needed.

House heating—Wood or coal stored in large quantities and fires kept burning day and night, seven months every year.

That is the picture of the six vital services required in every American home under conditions existing not so many years ago.

What has happened as the home has developed? The first five of these services now are supplied automatically in all new modern homes and in most of the older homes. In other words, it generally is taken for granted that water should flow in from a distant reservoir through a pipe, that gas should freely flow from a distant holder when food is to be cooked, that current from the power house should furnish a flood of light when it gets dark, that gas from the street mains should heat water as fast as it runs from the spigot, and that gas or electricity flowing through a meter should be used to cool the refrigerator and furnish dainty ice cubes as needed. The development of the home has depended largely upon shifting these five services to sources far removed from the house and operated and controlled sometimes miles away.

From *Heating and Ventilating Magazine.*

Is the home-owner going to continue to store fuel in his house and have the care of a fire every day for seven months each year? Or is the sixth and last of these services to follow the lead of the other five? I believe it is inevitable that house heating will follow the course of the other five because I feel sure the home-owner, in the future, will insist on the convenience of gas heat just as he has insisted on the other five services.

Gas house heating is emerging from its swaddling clothes and now is available in nearly every section of the country. The development period has been one of tremendous importance because it represents the entrance into the heating field, for the first time, of large, firmly established, progressive, amply financed, state-regulated, public utility companies.

The gas companies, many of them with records of more than a century of uninterrupted public service, presented something new to the home-owner and that was a complete heating service. That service is given first in a consulting capacity during planning and construction of the home and later by furnishing an uninterrupted supply of gas of uniform quality, supplemented by expert maintenance as long as the house stands.

And the gas companies are the only organizations that are in a position continuously to render this complete heating service and accept the immense responsibility which naturally it entails.

The development of gas heating service was not a hit-and-miss application of burners into boilers designed for crude fuels. Quite the contrary; it is the result of years of painstaking research supported by gas companies and gas boiler and furnace manufacturers throughout the country.

Manufactured-gas companies entered the house heating field about 1915. It generally is recognized that the city of Baltimore was the first to enjoy this luxury on a large scale. Other cities early in the field were St. Louis, Portland, Chicago, and New York.

The great impetus which the movement received in Baltimore was from the establishment of differential rates in 1915, which brought the cost of heating entire buildings with gas down to a reasonable percentage over the cost of heating with solid fuels. Since that time the wisdom of making special gas rates for house heating has generally been recognized and today there are nearly 500 special house heating rates in effect.

A most intensive development of house heating with gas has extended over the last decade. During that time experience had to be gained in handling the many details incident to maintaining a 24-hour service. In addition, many questions of policy had to be decided and tested out. One readily can understand the magnitude of a job that undertakes to supply uninterrupted day and night heating service to thousands of buildings—city, suburban and even farmhouses.

For over one hundred years it has been the spirit of gas men that the service shall not fail, no matter how trying the conditions. That spirit has been maintained for generations and it is now being applied to the minutest detail of servicing the customer's gas boiler and control equipment.

One of the finest movements toward putting automatic house heating on a permanently high plane was the preparation of "Approval Requirements for Central House Heating Gas Appliances" by the American Gas Association and the insistence of the association that all boilers and furnaces shall be tested under the "Requirements." This assures the public and the heating trade of equipment that is a guarantee of compliance with basic national requirements of safety.

House heating with gas has become standardized to a remarkable degree. Its reliability is a tribute to years of patient research on the part of those who supply the gas and service the equipment, as well as to those who offer such reliable boilers, furnaces and controls.

With the unprecedentedly wide distribution of natural gas and the great number of cities offering attractive house heating rates for manufactured gas, this method of completely automatic house heating is on a solid foundation. There are a number of cities served with natural gas that no longer have a single smokestack, either domestic or commercial. (Continued on page 507)

Pacific Coast Plans Cooperative Advertising

ADVERTISING interest in the gas industry is now directed to the Pacific Coast, as a result of the recent announcement of the Pacific Coast Gas Association that cooperative regional advertising would be started shortly.

Four companies—the Pacific Gas & Electric Co., Southern Counties Gas Co., Southern California Gas Co., and Los Angeles Gas and Electric Corp.—have underwritten a cooperative advertising program to begin August 14 and to include a six-month period of radio broadcasting and full-page space in six issues of a number of industrial magazines on the Coast.

F. S. Wade, chairman of the Pacific Coast Gas Association Ways and Means Committee on Cooperative Advertising, has written all Pacific Coast companies holding membership in the Association, inviting them to join on a meter basis in this coastwide advertising effort which already has been definitely endorsed by the four companies named.

Cost of the six-month program is being covered entirely by the utility companies participating, and will not exceed one and a half cents per meter. The cooperative advertising as now outlined and approved by the executive committee has the following salient features: Participating gas companies on August 14 will begin radio broadcasting through the *Woman's Magazine of the Air*, conducted by the National Broadcasting Co. over its Pacific Coast network, comprised of stations KHQ, Spokane; KOMO, Seattle; KGW, Portland; KGO, Oakland; KPO, San Francisco; and KFI, Los Angeles.

A series of 26 weekly programs each 20 minutes in length will be put on the air, the time selected being 11:00 a.m., which authorities deem the best woman's hour. Subjects will differ each week and will touch such vital topics as oven canning, gas refrigeration, house heating, oven cooked meals, roasting, vegetable cooking, water heating, laundering and many others.

Johnston-Ayres Co., advertising agency, has been delegated to handle details of the cooperative advertising campaign. Through this company individualized industrial advertising messages will be released in full-page space in trade media reaching a number of basic gas-using industries on the Pacific Coast.

To tie in with the broadcasts there will be a 48-page booklet of recipes, menus, and miscellaneous information regarding gas appliances. There will also be available mats of newspaper advertisements, counter and window cards for display in gas company and dealer establishments, and two other booklets are also being considered.

The talks themselves have been written with the idea of making them informative and educational rather than of an advertising nature, the idea being to make housewives gas conscious and to overcome the tendency to regard gas as an old-fashioned fuel. Stress, of course, will be laid on modern gas appliances by telling of what can be done with them.

NATURAL GAS DEPARTMENT NOMINATIONS

THE Nominating Committee of the Natural Gas Department makes the following nominations to be voted on by the Department at its meeting in Atlantic City, Oct. 16 next:

For Chairman, Henry C. Morris, Dallas Gas Co., Dallas, Texas.

For Vice-chairman, H. C. Cooper, Hope Natural Gas Co., Pittsburgh, Pa.

For members of Managing Committee, two-year term:

L. K. Langdon, Cincinnati, Ohio.
H. L. Montgomery, Bartlesville, Okla.
J. B. Tonkin, Pittsburgh, Pa.
M. W. Walsh, Louisville, Ky.
Wm. Moeller, Jr., Los Angeles, Calif.
Geo. E. Welker, Oil City, Pa.

For member Managing Committee, one-year term, to fill unexpired term of H. C. Cooper:

J. R. Munce, Pittsburgh, Pa.

Submitted by A. W. Leonard, chairman, J. D. Creveling, and H. J. Hoover—Nominating Committee, Natural Gas Department, American Gas Association.

Gas Engineer Receives Chemical Engineering Degree

L. E. Biemiller

ON June 24 at Madison, Wis., Lawrence E. Biemiller received the professional degree of chemical engineer from the University of Wisconsin. Mr. Biemiller graduated from Johns Hopkins University in 1921, and took an M.S. at Wisconsin the following year. Since that time he has been with the Consolidated Gas Electric Light & Power Company of Baltimore, Md., as industrial gas engineer. He is a member of the Managing Committee of the Industrial Gas Section, American Gas Association.

Mr. Biemiller's thesis was entitled, "The Utilization of Manufactured Gas." Besides setting forth certain advanced engineering phases of gas combustion and the application of heat derived from combustion under various conditions, the thesis included some original research work in the trends of gas sales in different localities and of the several classes of consumers. The thesis was well received.

It is of interest that the only other degree of chemical engineer awarded by the University of Wisconsin this year went to another man in the gas industry, H. R. Broker, of Racine, Wis.

Public Service of Jersey Has New Gas Rate Schedule

THE Public Service Electric and Gas Company, of Newark, N. J., has announced a new schedule of gas rates. While the rates are not those desired by the company, which were found unacceptable by the Public Service Commission, they increase the bill of the convenience customer and decrease the cost to the large user. Under the new rates those consuming up to 3000 cubic feet will pay more, while those using 3200 feet or over will pay less.

American Gas Association Service Letter No. 85 discusses the decision. Copies of this were recently mailed to all A. G. A. members.

The new schedule of rates is as follows: Up to 400 cu.ft., $1; the next 1000 ft. at 11 cents per 100 cu.ft.; the next 48,000 at 9.5 cents; the next 50,000 at 9 cents; the next 400,000 at 8.5 cents; the next 500,000 at 8 cents; the next 1,000,000 at 7.5 cents; the next 1,000,000 at 7 cents; the next 1,000,000 at 6.5 cents, and all over 4,000,000 at 6 cents.

Thomas N. McCarter, President of the company in a statement issued on the gas rate decision said:

"Although the gas rate schedule recommended by the Utility Board is not what we had hoped to receive nor, in my judgment, what we had the right to expect, nevertheless we have determined to accept the Board's recommendation and give the new rates a fair trial.

"It was made clear at the outset of the case that we were endeavoring to set up a new rate structure that would promote the larger use of gas and at the same time be more equitable to all classes of consumers.

"We believe that the Board in its suggested schedule has recognized the principle for which we contended, namely, the establishment of rates which will induce larger use of gas for both domestic and industrial purposes, and while we feel that the schedule which we filed would more nearly have served this purpose, we are hopeful that the rates recommended will bring about a condition beneficial alike to the public and the company."

Copies of Core Baking Papers Are Available

THERE are available at American Gas Association headquarters, 420 Lexington Ave., New York, N. Y., copies of a paper on "Baking Practice for Oil-Sand Cores," by H. L. Campbell, associate professor of metallurgical engineering, University of Michigan, Ann Arbor, Mich.

This paper was presented at a recent meeting of the American Foundrymen's Association, and contains information which was obtained during an investigation of core-baking practice which is being conducted at the University of Michigan for the Committee on Industrial Gas Research of the American Gas Association.

Peter Brady Wins McCarter Medal For Life-Saving

Peter Brady

KNOWLEDGE of the Schafer prone pressure method of resuscitation enabled Peter Brady, of the Peoria division, superintendent of the Illinois Power & Light Corp., to save the life of a neighbor from gas asphyxiation. His act has been recognized by the American Gas Association in the award of a McCarter Medal. The Medal was presented to Mr. Brady at a recent safety meeting of fellow employees in Peoria.

Lessons Learned from Gas Holder and Other Explosions

By HERBERT W. ALRICH

THIS article embraces gas explosions exclusively. While it has been estimated that there are about 12,000 gas holders in the United States and Canada, they are not numerous in comparison with other engineering works, such as bridges, office and commercial buildings, warehouses, armories, pier sheds, railroad stations, school and college buildings, hotels and other structures too common for enumeration, but far more familiar to both engineers and the public than are the containers used for the storage of gas.

Restricting the word "explosion" to its essential meaning, history provides a record of but three gas storage holders which have been wrecked by their own ignition and detonation. Some other mishaps to gas holders, which have been reported and spoken of as explosions, were in fact structural failures, sometimes followed by a fire but not by an explosion.

Circumstances under which gas holder explosions occur differ in no essential way from those pertaining to other gas works explosions. As a matter of fact, gas explosions permit division into but two classifications: Those that have occurred within the field of operations under the control of gas company employees, and those occurring elsewhere. However, certain factors apply to all cases.

While it may be impossible to ascertain the exact circumstances which resulted in a particular explosion, there remain no unsolved mysteries as to just how a gas explosion may occur. They are all the result of a mechanical failure, a human failure, or a combination of both. A mechanical failure may be illustrated by a defective valve which fails to close, a human failure by a workman neglecting to close a valve, and the combination by a valve which fails to close together with a workman who fails in proper recourse after discovering that the valve had not closed.

The majority of gas explosions are the result of human failure—carelessness, inexperience, recklessness, mismanagement, and even ignorance. While incompetence embraces all of these delinquencies, they are severally mentioned for the reason that in particular cases they separately appear. Frequently, more than one of these human factors have contributed to an explosion. Carelessness is represented by an instance where workmen, altering the gas connections in an exhauster room, permitted an unnecessary amount of gas to escape and neglected to open the windows for ventilation, but did open the double doors into the adjoining boiler room, causing ignition; inexperience, by the circumstances that the foreman in charge was a new man who had never managed such a large job before and failed to anticipate the difficulties of his task; recklessness, by his undertaking to replace a blank flange on a gas main with a gate valve with gas escaping under pressure during the transfer; mismanagement, by the failure to check the bolt hole drilling in the valve with the drilling in the pipe flange before the work was undertaken, by which means it would have been discovered that they did not match; ignorance, by his assuming that an explosive mixture could not exist in an enclosure where his men were able to breathe.

A gas explosion is the result of the ignition of a mixture of combustible gas and air; neither can explode without the other. The proportion of each composing an explosive mixture is dependent upon the composition of the gas. If the mixture of gas and air contains an excessive proportion of gas, ignition will cause harmless combustion. If, on the other hand, it contains an excessive proportion of air, there will occur neither combustion nor an explosion. Contrary to the common belief, the most violent explosions result from the leaner mixtures: that

Mr. Alrich is assistant engineer of construction for the Consolidated Gas Company of New York, N. Y.

is, where the proportion of gas is just above the lower limit where ignition could occur. Ignorance of this fact is the source of the mischievous delusion that human beings cannot breathe in a room where an explosive mixture of gas exists.

Experience with gas explosions teaches the following lessons:

All leaks in gas piping and apparatus should be promptly repaired, particular attention being given to the stuffing boxes of gate valves.

Immediately upon the observation of an odor of live gas the source of its escape should be sought and eliminated.

Employees should be discouraged from believing that they can become accustomed to inhaling gas, because that delusion makes them indifferent to its escape.

No reliance should be placed upon either valves or water seals, where an escape of gas could result in an explosion. For instance, the gas mains should not be connected to a new gas holder until it has been purged and is immediately ready to receive gas, nor should an old holder out of commission for repairs be entered until the gas mains have been physically disconnected from the holder.

All construction or repair operations of such a nature that mismanagement could result in the mixing of gas and air, and therefore an explosion, should be in charge of men having both experience and authority. One serious explosion on record was the result of the lack of authority on the part of the man in charge to disturb the established routine of the plant operation, his superior being beyond communication at the time.

Such work as that referred to in the previous paragraph should be carefully planned in advance, and the procedure outlined in a written memorandum to be read beforehand by all whose cooperation is necessary.

Safe procedure should never be allowed to be an inconvenience.

(Continued on page 498)

K. R. Knapp Starts Pipe Joint Research at Cleveland Laboratory

ACTIVE work in the American Gas Association's plan of research in pipe joints, authorized by the Executive Board on recommendation of the Technical Section, was begun July 1 in the Association's Testing Laboratory in Cleveland, where K. R. Knapp, of Philadelphia, assumed charge as research engineer. His work has been outlined by the Committee on Pipe Joints, of which O. S. Hagerman, American Light and Traction Company, is chairman, and which is a sub-committee of the Distribution Committee. The major portion of the proposed research is to be conducted at the Laboratory.

Mr. Knapp comes to the Association with eleven years' distribution experience, comprising nearly six years in straight distribution, nearly six years in special appliances, and six months in an investigation of pipe joints.

He attended Penn Charter school of Philadelphia, graduating in 1907 to matriculate at the University of Pennsylvania, from which he was graduated in 1911 with a degree in mechanical engineering. Entering the employ of The United Gas Improvement Company immediately after graduation, Mr. Knapp was variously employed in distribution untill 1922. Half of this time was spent in straight distribution work in Philadelphia, and the remainder in special appliance utilization and maintenance.

From 1922 to 1929, Mr. Knapp was employed in the appliance laboratory of the U. G. I., his activities being devoted largely to a study of utilization of mixed gases, as well as other miscellaneous testing. During the first part of 1929, Mr. Knapp was engaged in a special study of distribution problems, including testing of cast iron pipe, regulators, and pipe joints.

A Simplified Iodine Pentoxide Apparatus for Determination of Carbon Monoxide in Flue Gas

By F. E. VANDAVEER and R. C. GREGG

DURING the past three years there has been developed at the Testing Laboratory of the American Gas Association in cooperation with the U. S. Bureau of Standards an iodine pentoxide apparatus which retains a high degree of accuracy, is comparatively simple to operate, and permits rapidity of determination. A complete analysis with an accuracy of 0.002 per cent may usually be made in about 20 minutes. With this simplified apparatus one chemist can operate two or three instruments and make as many as 50 determinations per day.

Iodine pentoxide has been used for determining concentrations of carbon monoxide for many years. The reaction was described by Ditte[1] in 1870, and its first use for the detection of carbon monoxide was by La Harfe and Reverdin[2] in 1888, and by A. Gautier[3] in 1890. From the latter date until the World War, few publications treated this subject, but since 1914 a great deal of material resulting from research has been published. A bibliography of articles and treatises dealing with the subject is given at the end of this paper.

Types of Apparatus Used by Various Investigators

Many of the methods and apparatus used heretofore have been developed for certain particular problems and differ essentially in the system used for purifying the gas before passing through the iodine pentoxide, the temperature to which the iodine pentoxide is heated, the manner of purging the system, and the method of determining the amount of carbon monoxide present.

Probably the apparatus most widely known in this country previous to the development of the present one is that described in Technologic Paper 222 of the U. S. Bureau of Standards. Chromic acid heated to 100° C., sodium hydroxide (liquid), concentrated sulphuric acid, sodium hydroxide (solid), and phosphorus pentoxide, used in the order mentioned, constituted the purification system. The iodine pentoxide was heated to a temperature of 155° C. by means of an oil bath. Air obtained from the room for purging the system was passed through concentrated sulphuric acid, activated charcoal, and a mercury trap. The amount of carbon monoxide in the sample was determined by collecting the iodine liberated in potassium iodide and subsequent titration with sodium thiosulphate.

Another apparatus, described in Bulletin 197 of the U. S. Bureau of Mines, has been used considerably. The one designed by the Bureau of Standards is used primarily for determining concentrations of carbon monoxide in the products of combustion from gas appliances, that of the Bureau of Mines for determining the amounts of carbon monoxide in any usual mixtures of gases in which it may be present. As a purifying system, concentrated sulphuric acid, lead acetate, barium hydroxide, concentrated sulphuric acid, fuming sulphuric acid, concentrated sulphuric acid, potassium hydroxide, and sulphuric acid are used in the order named. The iodine pentoxide tube is electrically heated to 150° C. by means of a wire-wound jacket. For purging the system, air is taken from the room and passed through potassium hydroxide solution and soda lime. Instead of collecting the iodine liberated, the carbon dioxide produced is absorbed by a standard solution of barium hydroxide and the excess is

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Mr. Vandaveer is chief chemist at the American Gas Association Testing Laboratory, Cleveland, Ohio.
Mr. Gregg is chemist at the A. G. A. Testing Laboratory.

This paper was presented at a recent meeting of the American Chemical Society at Columbus, Ohio, and is reprinted from the July issue of *Industrial and Engineering Chemistry*.

[1] Ditte, *Bul. Soc. Chim.*, 13, 318 (1870).
[2] C. de la Harfe and F. Reverdin, *Chem. Ztg.*, 12, 1726 (1888).
[3] A. Gautier, *Jour. Gas Lig.*, 121, 547.

R. C. Gregg

F. E. Vandaveer

titrated with an oxalic acid solution. Both the apparatus of the Bureau of Standards and that of the Bureau of Mines are capable of giving accurate results but are cumbersome to manipulate, require a long time and a large amount of gas for purging, and are somewhat difficult to keep in good operating condition.

For determining concentrations of carbon monoxide in motor exhaust gas, M. C. Teague,[4] on account of the gasoline vapor and heavy unsaturated hydrocarbons present which reacted with iodine pentoxide, devised another type of apparatus. The purification system consisted only of liquid air, which condensed the carbon dioxide, water vapor, unsaturated hydrocarbon vapors, and gasoline vapors. A U-tube of iodine pentoxide was heated to 150° C. by means of an oil bath and iodine liberated by carbon monoxide was absorbed in potassium iodide and titrated with 0.001 N sodium thiosulphate. Such a system may give accurate and reliable results under nearly any condition. Liquid air, however, is not readily available in every section of the country and its general use in such an apparatus is not always possible. Precaution must be taken to see that the gases after leaving the liquid air are brought back to room temperature before entering the iodine pentoxide; otherwise they may cool the iodine pentoxide to such an extent that no reaction with carbon monoxide will take place.

In England, two very thorough investigations of the use of iodine pentoxide have been made by Davies and Hartley[5, 6] and by Wood and Howarth[7, 8, 9] resulting in the use of two slightly different systems. As a result of their investigations, Davies and Hartley use anhydrous calcium chloride, two U-tubes of calcium chloride, and phosphorus pentoxide in the purifications system when making determinations for carbon monoxide in the products of combustion from coal gas flames. The iodine pentoxide is heated to 125° C. in a gas oven. Air for purging the apparatus is purified by passing it through a separate system consisting of anhydrous calcium chloride, phosphorus pentoxide, iodine pentoxide heated to 125° C. in a gas oven, potassium iodide, potassium hydroxide solution, and soda lime. The amount of iodine collected in potassium iodide is titrated with sodium thiosulphate beyond the end point and back titrated with .001 N iodine solution.

The apparatus designed by Wood and Howarth is quite similar to that of Davies and Hartley, the reagents in their purification system consisting of calcium chloride, potassium hydroxide, calcium chloride, and phosphorus pentoxide. Recently they have included a tube of liquid air. Iodine pentoxide is heated to 120° C. by means of an electric air bath. For purging the apparatus, air is passed through a separate iodine pentoxide system which includes calcium chloride, phosphorus pentoxide, iodine pentoxide at 120° C., potassium iodide, and potassium hydroxide, in the order mentioned. Titration of the iodine is made with .05 N sodium thiosulphate.

Neither of these systems has provision for removing aldehydes or unsaturated hydrocarbon, except when liquid air is used; and the use of a separate iodine pentoxide apparatus for purification of the purge gas tends toward slow manipulation.

Development of A. G. A. I_2O_5 Apparatus

When the American Gas Association Testing Laboratory began operations, it became

[4] M. C. Teague, *Jour. Ind. Eng. Chem.*, 12, 964 (1920).
[5] Davies and Hartley, *Gas Jour.*, 174, 530 (1926).
[6] Davies and Hartley, *Gas Jour.*, 179, 334 (1927).
[7] J. W. Wood and G. B. Howarth, *Gas Jour.*, 175, 787 (1926).
[8] Wood and Howarth, *Gas Jour.*, 178, 824 (1927).
[9] Wood and Howarth, 19th Report, Gas Investigation Committee, Inst. Gas. Engr.

necessary to develop an iodine pentoxide apparatus to determine rapidly concentrations of carbon monoxide in products of combustion with an accuracy of at least .002 per cent. Some of the apparatus already in use, although sufficiently accurate, had the disadvantage of being slow and cumbersome to manipulate. This was caused primarily by the number of purifying materials used and the method of obtaining carbon monoxide-free air for purging. The Bureau of Standards constructed the first apparatus for the Laboratory, which has formed the basis for the development of the present model.

Purifying System Used: Since all determinations were to be made on flue gases, it was possible to simplify the purifying system considerably. The flue products to be analyzed were in all cases from the combustion of gas which contained practically no hydrogen sulphide. Due to this fact, lead acetate could be eliminated. Absorption of carbon dioxide from the sample by means of barium hydroxide and potassium hydroxide was unnecessary, as the amount of carbon monoxide in the sample was to be determined by titrating the amount of iodine liberated in the reaction: $5CO + I_2O_5 = 5CO_2 + I_2$. The small amount of carbon dioxide in the sample which might be absorbed in the potassium iodide solution did not affect the titration of the iodine with sodium thiosulphate. It was decided to titrate the iodine instead of the carbon dioxide for the following reasons:

1. It would then be unnecessary to remove carbon dioxide completely from the sample.
2. It is difficult to absorb all the carbon dioxide and the use of barium hydroxide solutions weaker than .02 N is undesirable.
3. A more distinct end point may be obtained with iodine and .001 N thiosulphate using a starch indicator.

Consequently, the removal of sulphur dioxide and carbon dioxide being unnecessary, barium hydroxide and potassium or sodium hydroxide solutions were omitted. The function of the purifying train would then be to remove water vapor, unsaturated hydrocarbons, and aldehydes. Since heavy hydrocarbons and gasoline vapors are not usually present in flue gas, it was unnecessary to use liquid air. Oxides of nitrogen, if present at all, are not sufficiently concentrated to affect the iodine pentoxide, as will be shown later.

For the removal of unsaturated hydrocarbons, aldehydes, and some water vapor, two scrubbing towers of chromic acid (made by saturating concentrated sulphuric acid with potassium dichromate) were used. In the beginning of the investigation the first chromic acid tower was heated to a temperature of 100° C., but a series of experiments indicated that very little difference was noted if this tower was heated or maintained at room temperature. As a result both chromic acid towers are maintained at room temperature. To remove any acid spray and some carbon dioxide, a small amount of solid potassium hydroxide was placed at the top of the V-tube (26 in the illustration) and the remainder of the tube was filled with phosphorus pentoxide. The latter reagent served to dry the gas completely before it entered the iodine pentoxide tube.

Iodine Pentoxide: The tube of iodine pentoxide is maintained at 150° C. At this temperature the reaction with carbon monoxide is rapid and complete. There is also the added advantage of a higher temperature to keep the iodine liberated from condensing on the walls of the capillary tubing leading from the U-tube to the Gomberg bulb. An electric air bath is used to heat the iodine pentoxide, the temperature of the bath being controlled manually by means of a rheostat in series with a resistance coil. Iodine pentoxide of high purity which has been found most satisfactory for this type of analysis is known as iodic acid anhydride and may be purchased from Mercks.

Pure iodine pentoxide does not decompose below 260° C., but the commercial grade usually contains lower oxides of iodine, iodic acid, and possibly other compounds, which decompose readily below this temperature. In order to prepare iodine pentoxide for use in analyzing for carbon monoxide, it is necessary to maintain it at a temperature of 205 to 215° C. for about two days, while air or nitrogen is being drawn through it at the usual rate. At this temperature all the un-

stable compounds are decomposed and removed from the system. The temperature is next dropped to about 150° C. and purging continued for about two days more, when the iodine pentoxide will usually be ready for use. No trace of iodine should be detected when starch is added to the potassium iodide solution after two or three hours purging with nitrogen. Once the iodine pentoxide is properly conditioned, it will give satisfactory operation for about six months when the apparatus is operated daily. Each day a blank may be obtained in about fifteen minutes.

Nitrogen Used for Purging System: For purging the apparatus and also to carry out of the iodine pentoxide tube all of the liberated iodine, a gas absolutely free from carbon monoxide must be used. Air from a room where any fuel is burning or that prevailing in most industrial districts contains some carbon monoxide. Consequently, if air is used for purging, some means of removing all carbon monoxide must be employed. An apparatus accomplishing this purpose would be practically a duplicate of the equipment used for the test and therefore would entail cumbersome manipulation and an unnecessary loss of time. In order to eliminate an added purification system, commercial nitrogen purchased in cylinders has been successfully used for more than two years. Nitrogen as made by the liquefaction processes is not only carbon monoxide-free but is inert and does not react with iodine pentoxide.

Description of Iodine Pentoxide Apparatus Used by the A. G. A. Laboratory

The complete apparatus, including the arrangement for purging with nitrogen, is shown in Figure 1. The sample is being drawn through the apparatus from the sample bottle (13) by means of a vacuum system attached to capillary tube 45. The sample passes successively through tube 7, chromic acid tower 19, chromic acid tower 24, V-tube 26, iodine pentoxide tube 30, Gomberg bulb 40 containing potassium iodide, and mercury seal 42 into the vacuum line attached to capillary tube 45. While the sample is passing through the apparatus, the nitrogen is overflowing through tube 4 since gas cock 5 is closed. After the sample has been taken into the apparatus, gas cock 8 is closed and gas cock 5 is open, so that nitro-

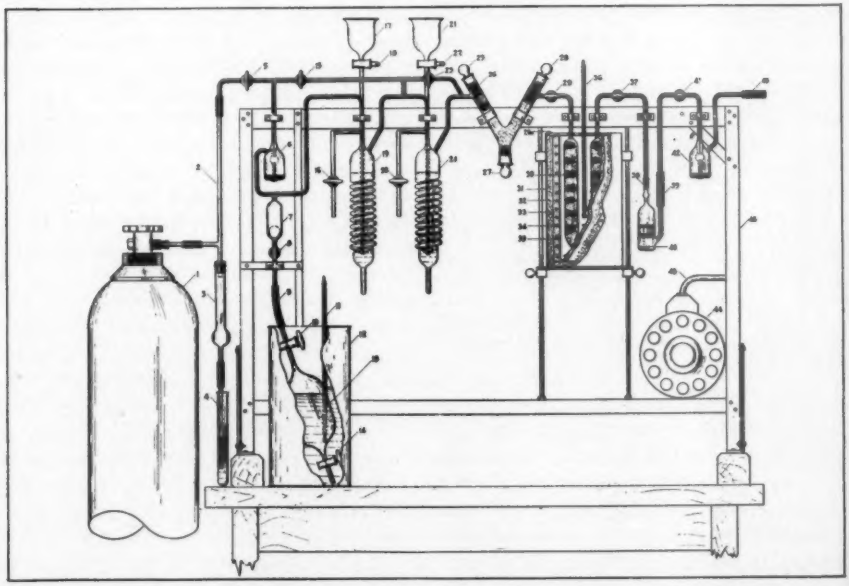

Fig. 1—Iodine pentoxide apparatus for determination of carbon monoxide in flue gas

gen passes down through mercury seal 6 and then through the system in the same manner as the sample. The flow of nitrogen is regulated so that there is a slight overflow through 4.

Sample bottle 13 is made of glass and has a capacity of approximately 500 c.c. The exact volume of the bottle is carefully determined and, by correcting the volume of gas it contains for temperature and pressure (atmospheric), the volume is reduced to standard conditions.

An electrically heated air bath 31 is used to heat the iodine pentoxide tube. This bath consists of two brass boxes 31 and 35. A sixty-foot coil 34 of 22-gauge (B & S) chromel A wire is wound on the insulation of the inside box. The coil is fixed by asbestos cement baked in place. The remainder of the space 32 is filled with asbestos fibre insulation, and an asbestos board (29a) is used to cover the top of the furnace. The temperature of the bath is manually controlled by a 100-ohm, 1.5-ampere circular rheostat 44 in series with the coil.

The chromic acid towers are filled through funnels 17 and 21. They may be emptied by attaching a suction flask to the glass tubes on which gas cocks 16 and 20 are located.

Beginning at the left, V-tube 26 contains at its top a layer of glass wool, below which is a layer of solid potassium hydroxide and next a layer of glass wool, the remainder of the tube being filled with phosphorus pentoxide. Stop-cocks 25, 27, and 28 are sealed in place with paraffin.

In the U-tube (30), there are ½-inch alternate layers of glass wool and iodine pentoxide.

The Gomberg bulb (40) has three compartments containing potassium iodide which provide ample scrubbing surface to absorb all of the iodine which may be liberated.

The frame (46) supporting the glass is made of 1-inch angle iron.

Preparation and Standardization of Solutions

Potassium Iodide Solution: A solution of ten per cent by weight potassium iodide and ninety per cent of weight distilled water is used. This solution should be kept in a dark place. If properly taken care of, it will remain satisfactory for use for several weeks, but, if allowed to stand in the sunlight, it will slowly decompose, so that an indication of iodine will be found with starch indicator. The fresh solution should show no trace of free iodine.

Starch Indicator: Potato starch has been found to be the most sensitive indicator for iodine. It is sensitive to two drops of .001 N iodine in 20 c.c. of solution, whereas wheat starch and soluble starch are sensitive only to three drops. To prepare the solution, dissolve two or three grams of starch in a few c.c. of cold water and add to 200 c.c. of boiling distilled water. Continue to boil for two or three minutes, then cool to room temperature. This solution should be made fresh every day, otherwise a distinct change from blue to white will not be obtained when titrating the iodine. Furthermore, when using an old solution, the color change will be from blue to pink, which does not change readily to white and gives an untrue end point. This same difficulty may be encountered if the purifying system is not properly removing sulphur dioxide or other acid gases to such an extent that the potassium iodide becomes saturated with them. When the iodine solution to be titrated is concentrated, it is best not to add the starch indicator until most of the iodine color has been discharged with the thiosulphate. If it is added to a concentrated solution, a flocculent precipitate may result, which obscures a true end point.

Sodium Thiosulphate Solution: This solution should be approximately .001 N or, in other words, 0.24332 grams per liter. Before standardization it should be allowed to stand about four weeks so that equilibrium may be attained, after which it will remain very constant in strength for several months. The practice followed by the A. G. A. Testing Laboratory is to make up a fresh solution each month which is not standardized or used until it has aged for at least one month.

Standardization of the thiosulphate solution may be made against pure iodine solution. Commercial iodine should be sublimed

similar to the method given in Treadwell-Hall Analytical Chemistry, Vol. II.

The pure doubly-sublimed iodine is weighed out very accurately to obtain approximately .001 N solution, and whatever normality is obtained is taken as the standard solution. Iodine is very hygroscopic and vaporizes easily so it is necessary to use special precautions in weighing. Place about two grams of potassium iodide and a few drops of water in weighing bottle and weigh. Then add about 0.2 gram of iodine and weigh. The difference in weight is the exact amount of iodine. Make up the solution to one liter with distilled water.

If desired, the normality of the iodine may be checked by arsenious oxide as outlined in Treadwell-Hall. However, for ordinary purposes the iodine weight and, therefore, normality may be taken as correct.

The sodium thiosulphate solution is then standardized against the standard iodine solution, using starch as the indicator.

To convert the thiosulphate into terms of carbon monoxide the following typical calculations are involved:

If 0.0974 grams of I_2 is weighed out per 1000 c.c.,
1 c.c. solution = .0000974 grams I_2.

By titration 10 c.c. I_2 = 8.37 c.c. $Na_2S_2O_3$;

Then 1 c.c. $Na_2S_2O_3 = \frac{10}{8.37} = 1.195$ c.c. I_2,

or 1 c.c. $Na_2S_2O_3 = 1.195 \times .0000974 =$ .0001164 gram I_2

1 c.c. $Na_2S_2O_3 = \frac{30,701,720}{64,674.59} \times .0001164 =$ .0552 c.c. CO at 60° F. and 760 mm. Hg.

The factor for changing c.c. $Na_2S_2O_3$ to c.c. CO is derived as follows:

Derivation of Factor: In standard sodium thiosulphate solution as made up, 1 c.c. = .000127 grams of iodine and, from the reaction $I_2O_5 + 5\ CO = I_2 + 5\ CO_2$, is equivalent to .00007 grams of CO by the following equation:

$$140 : 253.8 = X : .000127$$
$$X = .00007$$

Since 1 c.c. of carbon monoxide at 0° C. and 30″ Hg. = .00125 grams, .00007 grams = .056 c.c. of CO at 0° C. and 30″ Hg.

One c.c. of sodium thiosulphate .000127 grams I_2 .056 c.c. CO at 0° C. and 30″ Hg.

Converting to 60° F. and 760 mm. Hg.

$.056 : X = 273 : 288.55$

X = .0592 c.c. of CO at 60° F. and 760 mm. Hg. (dry).

As the sample taken is always saturated this figure must be converted from dry to saturated. The vapor pressure of water at 60° F. = 13.26 mm. Hg.

$$\frac{PV}{T} = \frac{(P' - p)\ V'}{T'}$$

where p = vapor pressure of water at 60° F. Then

$$\frac{760 \times .0592}{288.55} = \frac{746.74\ \ V'}{288.55}$$

V' = .0602 c.c. of CO at 60° F. and 760 mm. Hg. saturated.

Deriving the formula for securing the factor from the above;

$$\text{Factor} = \frac{140 \times 288.55 \times 760 \times X}{253.8 \times .00125 \times 273 \times 746.74}$$

where X = grams I_2 per c.c. of thiosulphate.

$$\text{Factor} = \frac{30,701,720}{64,674.59} \times X$$

Effect of Various Gases on Iodine Pentoxide

In order to determine the effect of all gases which may be present either in fuel gases or in the products of combustion of gas on the operation of the iodine pentoxide apparatus, these gases were prepared and a known amount of them drawn through the system. All the chemicals were in place when these tests were made.

Carbon Dioxide: Carbon dioxide obtained from carbonic acid cylinders was used for these determinations. Mixtures of carbon dioxide and nitrogen containing amounts of carbon dioxide varying from 4.7 per cent to 17.7 per cent were drawn through the apparatus. No indication of a reaction with iodine pentoxide was obtained.

Ethylene (typical of illuminants): Ethylene mixed with nitrogen in percentages varying from .043 to 1.93 per cent ethylene

(Continued on page 508)

A. H. Osborn

Morgan Day

W. J. Pennington

Wm. Sutliff

Ten Employees Win McCarter Medals

DURING the past few weeks ten McCarter Medals have been presented to employees of gas companies who have saved human life through knowledge of the prone pressure method of resuscitation. The McCarter Medal is awarded by the American Gas Association through the generosity of Thomas N. McCarter, President of the Public Service Corporation of New Jersey.

In many of the cases which are briefly reviewed here, there was a large element of personal danger involved. To wear the McCarter Medal is a high honor, as it shows bravery and knowledge to do what has to be done in an emergency.

It is interesting to note that four of these ten medal winners are employees of The Public Service Electric & Gas Co., Newark, N. J.

George Bekar, fitter, of the Public Service Electric & Gas Company, Paterson, N. J., received a medal for resuscitating a fellow employee who was overcome with gas while digging a ditch. Harry G. Robinson of the same company was awarded the McCarter certificate for assisting Bekar.

Ernest Nicktern, of Camden, N. J., received the McCarter Medal for saving the life of a woman who apparently attempted to commit suicide. A small boy about three years old was also asphyxiated and Nicktern applied the prone pressure method of resuscitation to both victims. Julius Hubert, also an employee of the company, assisted and for this he received the McCarter certificate.

George Bekar

Walter Kelly

G. P. Sullivan

E. Nicktern

James Dwyer

W. J. Daniel

William F. Sutliff, of Fairfield, N. J., received the McCarter Medal for resuscitating a man who was overcome with gas while sleeping.

Walter J. Kelly, of Newark, N. J., was awarded the McCarter Medal for saving the life of a man who had attempted suicide.

W. J. Pennington, of Penn Central Light & Power Co., Altoona, Pa., received the McCarter Medal for saving the life of a six-year-old boy who was accidentally overcome with gas. Boyd L. Hannon, an employee of the same company, assisted Pennington, and he received a special award from his company.

Alonzo H. Osborn, Northern Indiana Public Service Co., Lafayette, Ind., received the Mc-

Carter Medal for saving the lives of two young girls, aged 12 and 6 years respectively, who were accidentally overcome by gas. Osborn worked on the victims for an hour and a half. It is interesting to note that Osborn has also been awarded the Midland Utilities Company medal.

Morgan Day, of the Missouri Power & Light Co., Mexico, Mo., received the McCarter Medal for saving the life of a fellow employee who was overcome by gas while working in a ditch.

Wm. J. Daniel of the United Gas and Electric Co., Aurora, Ill., recently received the McCarter Medal for saving the life of a fellow employee who was accidentally overcome by gas while repairing a leak on a high-pressure main. The McCarter certificate was presented to Frank Katzmark, of the same company, for assisting Daniel.

James Dwyer, of the Brockton Gas Light Co., Brockton, Mass., received the McCarter Medal for saving the life of a woman who was overcome by gas. Dwyer was also awarded a citation for meritorious service by the Chas. H. Tenney and Company.

George P. Sullivan, of the Derby Gas and Electric Co., Derby, Conn., received the McCarter Medal recently for saving the life of a man who was accidentally overcome by gas. Sullivan and Wm. H. Stier, Daniel McGeough, and Robert Hennessey, employees of the same company, found the victim in bed in a coma. The prone pressure method of resuscitation was applied for about a half-hour. Stier, McGeough, and Hennessey were awarded McCarter certificates.

Public Service of New Jersey Plans to Mark Gas Holders

AIRPORT markers will soon be placed on top of gas holders in the New Jersey territory served by The Public Service Electric and Gas Co. The first of the markers will be attached to the Harrison holder. Other holders to be so marked in the near future are those at Caldwell, Dumont and Somerville.

The markers, whose purpose is to aid aviators in checking their courses and to show the direction and distance of the nearest airport field, will be types approved by the Department of Commerce, and will be designed in chrome yellow.

The marker to be placed on the Harrison holder will consist of a circle eighty feet in diameter on the inside of which will appear the letter "M," 20 feet high, indicating that the Newark Airport is in the metropolitan class. Outside the circle will be two large signs 172 feet long, spelling "Newark" in letters 28 feet high, which can be read from an altitude of 3500 feet. An arrow seventy feet long with a large "N" in the center will point to the true north. Another arrow, 50 feet long, with a large number "2" in front of it, tells the distance and direction of the airport.

R. L. Manier Is Made Chairman of A.S.S.T. Chapter

R. L. Manier

RALPH L. MANIER, industrial fuel engineer, Syracuse Lighting Company, Syracuse, N. Y., was recently elected chairman of the Syracuse Chapter of the American Society for Steel Treating. Mr. Manier has been a leader in the work of the Steel Treaters for some years and has been instrumental in building up the Syracuse Chapter which now consists of nearly 100 metallurgists and production men from the large plants in that vicinity.

Mr. Manier has written a number of scientific papers, and has presented talks on industrial heating applications where gas, oil, electricity, or coal is the heating medium. He is an active member of the Managing Committee of the Industrial Gas Section of the American Gas Association, and has been instrumental in furthering the research in the phenomena of decarburization of steel, which is being sponsored by the A. G. A. Committee on Industrial Gas Research.

Mrs. Fredericks Travels Far For Gas Company Magazine Material

MRS. CHRISTINE FREDERICKS, who is on the editorial staff of the gas company magazine for women, Comfort at Home, sailed for Europe on the Olympic on June 7. Mrs. Fredericks will visit eight countries and bring back stories and photographs interesting to all women because they will clearly indicate the leisure given the women of America by modern gas and electric appliances.

Europe, in the use of gas, has done some interesting things: One town, for instance, which Mrs. Fredericks will visit, has had every house in the town heated by gas for a period of 17 years.

Since the magazine, Comfort at Home, was first placed on the market by the Bowser Service Corporation of New York, Mrs. Fredericks has given them her personal cooperation, believing that modern gas appliances have rendered a real service to all women and that this magazine presents in the women's language a modern standard of living, working for the utility and the homemaker.

SALESMEN'S COMPENSATION

How We Do It

By R. G. MUNROE

The successful salesman is the one who is paid on a sound, scientific basis.

THE salesmen's compensation plan which may be relied upon to yield the best results is that one which most nearly and most obviously maintains identical the interests of the company and its salesmen. The compensation system should automatically direct the efforts of the sales representatives along the paths most beneficial to the company. Nor does this line of reasoning ignore the fact that in the final analysis the interests of the company and of its customers are also identical.

The simplest form of compensation and the least expensive to administer is the flat salary. With constant attention, frequent readjustments, and superlative judgment on the part of sales management, excellent results may be accomplished. But the flat salary plan is too inflexible and demands too much attention from sales executives whose energies should be conserved for other important activities by every possible automatic feature.

The employee who works in the office, at the plant, or in the open, with fixed working hours, at an established rate of performance, and under more or less constant supervision, functions fairly satisfactorily when paid a flat wage per day or per month. But the salesman who goes out of the office and beyond the sight and the direct supervision of his employer, and who must generate his own driving power and enthusiasm, and boss his own efforts unassisted for hours and days at a time, needs a most flexible and skilfully planned compensation schedule. He needs a pay plan which rewards good performance swiftly, surely, and spectacularly; a plan which is simple and easily understood, but which premiumizes every detail of a good job well done.

In Denver we have tried many compensation methods since Henry L. Doherty first inaugurated intensive house-to-house solicitation 30 years ago. We have learned that a plan may be perfect in theory, but in practice so difficult to understand and so expensive to administer as to be worthless. On the other hand, we have found that a simple and easily administered plan, such as a fixed percentage on gas-consuming merchandise, frequently directs the efforts of the salesmen into most undesirable channels.

As a result of our experiences and needs, we devised in Denver during 1927 the plan of salesmen's compensation which has been in effect in our gas new business department since January 1, 1928. In outlining this system we first gave careful consideration to the fundamental objectives of the sales department of a gas company. These we hold to be as follows: The securing of a maximum and satisfactory volume of additional gas gross revenue, of the best possible load characteristics, at the minimum sales costs

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Mr. Munroe is gas new business manager, Public Service Co., of Colorado, Denver, Colo.

Presented at Northern Regional Conference, Pacific Coast Gas Ass'n, Victoria, B. C., June 7-8.

per dollar, together with the constant improvement of public relations and of service to customers.

We attempted to devise a pay method which would cause the sales representative to realize himself as a partner in the business, and which would so broaden his viewpoint as to enable him to distinguish good business from business not so desirable. We sought to attract the best of sales talent by attractive and unlimited earnings to the extremely capable salesmen, and with a substantial minimum guarantee as protection over periods of illness, vacations, territory re-assignments, etc.

The plan is as follows:

First: A substantial monthly drawing account or guaranteed minimum against which all commissions are applied.

Second: A revenue or load-building commission varying in amount according to the gas revenue value of the equipment sold, taking into consideration annual gross revenue, annual net revenue, and load characteristics.

Third: A percentage of the gross profit resulting from merchandising sales.

Fourth: A percentage of all cash down-payments collected with orders.

Fifth: Special temporary bonuses or penalties applied or taken off at any time for such purposes as special drives on certain appliances, introduction of new equipment, the disposition of obsolete stock, or the penalizing of certain undesirable merchandising activities.

By gross profit is meant the difference between the selling price of a given piece of equipment and the total costs of appliances and installations. These costs include such items as freight, cartage, and fitting-shop expenses, but do not cover such expenses as commissions, office expense, advertising, etc. Refunds resulting from the adjusting of misunderstandings with customers are charged against the salesman's gross profit for the month, as well as all losses and depreciations in connection with returned appliances.

Paying a portion of the merchandise gross profit to the salesman improves his ability to overcome customers' objections, surmount obstacles, better his selling-technique and make of himself a better business man. We have observed that requests for larger allowances on old equipment taken in on exchange for new merchandise have almost disappeared. It is now common practice to give allowances for old appliances much less than the maximum permitted in the company's schedule, whereas, when these same men were on a straight merchandise commission, continual pressure was brought to bear upon department heads to approve larger trade-in allowances. Under a straight merchandise commission there is a tendency on the part of most salesmen to feel that the merchandise they are handling is priced too high. Experience with the gross-profit commission has brought out the fact that the salesmen now urge the company to maintain proper selling prices, arguing that good salesmenship can overcome low-priced competition.

The payment of revenue or load-building commissions based on the value of the equipment sold, from both revenue-building and load-factor standpoints, is most important. A careful analysis was therefore made of the revenue-producing value of each appliance or piece of equipment, as well as the load characteristics of its consumption. It was ascertained in the domestic field that the replacement of a manually operated tank water heater with an automatic storage water heater occasioned an average yearly increased consumption of 29,000 cu.ft. of manufactured gas, the greater part of this consumption coming on the valley of the annual load curve. Analyses were made of the revenue value and load characteristics of the increased gas consumptions of many other appliances and gas usages, such as ranges, manually operated water heaters, fire-place heaters, incinerators, laundry stoves, house heating installations, and various commercial and industrial equipment. Revenue or loadbuilding commissions and percentages were then set up to direct automatically the efforts of the salesmen toward the desired objectives. The revenue commission as set up caused the selling of a much greater percentage of large-revenue-producing and off-peak-consumption equipment. The effort put forth by salesmen to install better revenue-producing equipment will be greater where the reward

is larger. It is well to remember the more desirable the business secured the more liberal the revenue commission should be.

We find from actual experience that salesmen soon learn that cash down-payments are obtained much easier than they at first thought possible. Also they now realize that cancellations and returns are less apt to occur when some cash is collected in advance. Down-payments have increased by at least 100 per cent, and a surprisingly large number of sales have been made—full cash with the order.

A total of 65 territory gas sales representatives were paid upon this plan during 1928, of which 26 were domestic gas representatives, 30 domestic house heating representatives, four hotel and restaurant representatives, and five industrial gas sales engineers. Only the domestic gas division operated under this plan without change in the number of men employed for the year as compared with the number employed during the preceding year of 1927. A comparison of the results of this division then operating under the plan above described with the results accomplished during the preceding year, at which time a merchandise percentage plan was in effect, reveals the following facts:

Gas new business expenses for 1928 were reduced 31 per cent under those of 1927, although gas merchandise sales were increased by 13 per cent, and at the same time sales representatives' compensations were increased by 33 per cent. The effect of the combination of loadbuilding and merchandise-profit commissions was to divert the efforts of the salesman from the seeking of mere merchandise volume to the securing of extremely desirable business. The sales of large consumption equipment such as storage water heaters, incinerators, etc., increased enormously, while sales of lower-revenue value equipment, such as manually operated water heaters and gas range replacements, fell off. Storage water heater sales for 1928 were 111 per cent above those of 1927, and a few dozen incinerators were sold as compared with practically none during the previous year. The domestic manufactured gas revenue was increased 11.6 per cent over the manufactured gas revenue of the previous year in spite of the steady inroads of the delicatessen stores, the bakeries, the laundries, and the apartment-house builders upon our domestic sales per customer. This domestic revenue increase was all the more remarkable on account of the removal of customers from the domestic gas classification as rapidly as they installed domestic all-gas house heating equipment. Our domestic house heating revenue is not included in our domestic classification, but is reported separately.

Many salesmanagers are working overtime to solve their problems when compensation is at fault and needs correction

In the house heating division several thousand domestic all-gas house heating customers were secured on this compensation schedule at a selling expense of considerably less than $10 each.

The industrial and commercial divisions did not commence to operate under this schedule until several months after the first of the year. These divisions accomplished during 1928 the sale of industrial and commercial gas-consuming equipment totalling 82 per cent more than the sales for 1927. On account of this large increase it is difficult to accurately judge the effect of the new compensation plan, but it is significant that industrial and commercial new business expenses decreased 46 per cent below those of 1927, notwithstanding that much more desirable load was secured, and that salesmen's compensations were increased by 45 per cent.

We have sought to offer the greatest possible compensation incentives to stimulate

(Continued on page 504)

One of the
FLAMING SIX
The six helpful services of the gas flame

GAS

GAS Incineration

The Gas Incinerator is modern science's clarion call to household sanitation. It represents the first truly modern step forward in the household disposal of garbage and rubbish since medieval times. The Gas Incinerator is an inexpensive gas appliance which quickly, silently, and without odor reduces garbage and trash to a handful of fine white ash. So quickly has this sanitary appliance been adopted by discerning householders, that it can now be said . . . no home is fully modern without one. In the truly modern All-Gas Home served by the helpful FLAMING SIX services of gas . . . the Gas Incinerator provides a sanitary and pleasant means of garbage disposal.

Household Gas Incineration is fast growing in importance because it has a direct bearing upon the health of your family, and especially your children. It eliminates the menace of the fly-breeding garbage can. Waste matter is simply thrown in — the lighter button pressed — and gas flame does the rest. . . . Quickly and easily installed in your basement for a very small down payment.

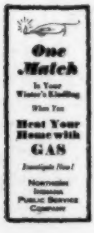
NORTHERN STATES POWER COMPANY

THE NORTHWEST CAPITAL. Nine trunk railway systems with twenty-three lines, make St. Paul not only the railway center, but the logical distributing point for the entire northwest territory. This territory served by St. Paul's railroads represent not only an ample market for St. Paul's manufactured products, but is also one of the richest and most fertile producing areas in the world. St. Paul's location is thus a double advantage in that its consumption and production are amply provided for by its surrounding territory.

THE ADVE

Teaser advertisement used in daily papers preceeding the series of advertisements based on the "Flaming Six" idea

With the advent of Electrolux, the gas refrigerator, noiseless, non-mechanical refrigeration is not only a simple practical thing, an established everyday fact in tens of thousands of homes, but it is the really economical kind of refrigeration to have.
There is no machinery at all, not a single moving part to wear. Merely a tiny gas flame, a trickle of water, a simple refrigerating liquid — and that is all. Just light the flame once and the chilling action starts, to continue endlessly.
There is not a thing that should need renewal or replacement. Scientists can find no reason why the Electrolux should ever wear out, any more than a kitchen sink.
At the nearest display rooms of your gas company you can see this wonder for yourself. You will see a wide range of sizes and models in a choice of white or four beautiful color tones obtained by a new and exclusive "etching" process.
If unable to call in person, phone AD. 9221 and our representative will gladly call with full particulars. Send for case of refrigerator
electrolux-ser
the gas refrigerator
consumers' gas comp
55 adelaide st. e
779 lake shore road new toron



One Finger
Strikes the Furnace When You
Heat Your Home With GAS
The Modern Effortless Fuel
Phone for Information
Northern Indiana Public Service Company

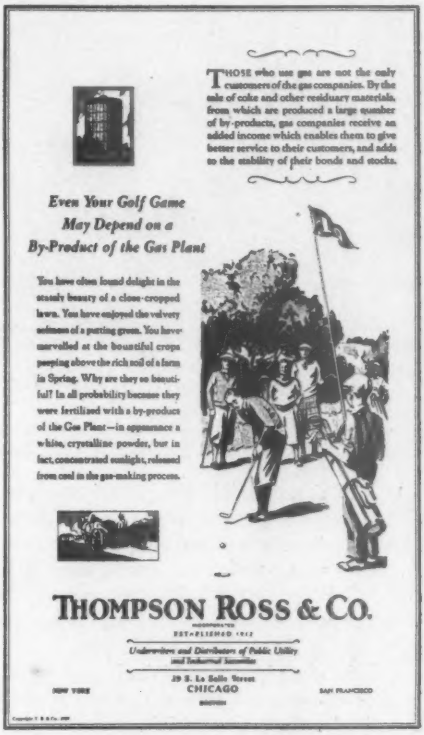
One of the "Flaming Six" series recently used in newspapers by the Northern States Power Co. The modernistic theme was carried throughout the series

At the left are two examples of small-space advertising

...VERTISING EXHIBITION

GAS HEAT
helps make
satisfied employees
People like to work in a plant where gas-fired appliances are used . . . Gas heat helps them produce better work; it keeps the high-class workmen on the payroll . . . And that cuts down your labor turnover, and increases your ultimate profit.
AMERICAN GAS ASSOCIATION
420 Lexington Avenue, New York
If it's done with heat, you can do it better with
GAS

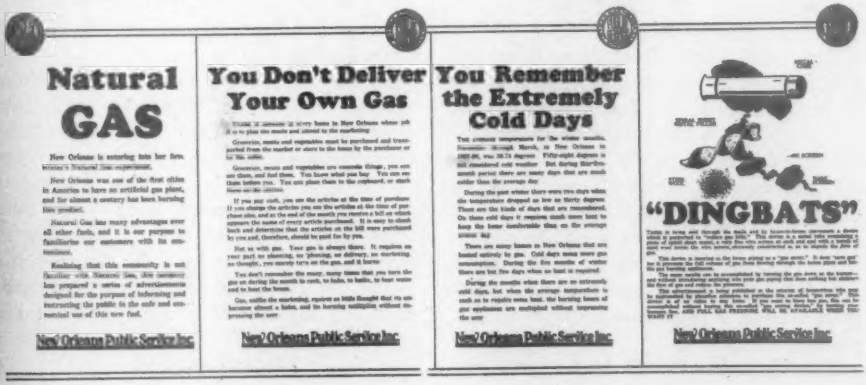
One of the series of advertisements which the American Gas Association is inserting in the leading trade and business papers of the country


THOSE who use gas are not the only customers of the gas companies. By the sale of coke and other residuary materials, from which are produced a large number of by-products, gas companies receive an added income which enables them to give better service to their customers, and adds to the stability of their bonds and stocks.
Even Your Golf Game May Depend on a By-Product of the Gas Plant
You have often found delight in the steady beauty of a close-cropped lawn. You have enjoyed the velvety softness of a putting green. You have marvelled at the bountiful crops peeping above the rich soil of a farm in Spring. Why are they so beautiful? In all probability because they were fertilized with a by-product of the Gas Plant—in appearance a white, crystalline powder, but in fact, concentrated sunlight, released from coal in the gas-making process.
THOMPSON ROSS & CO.
ESTABLISHED 1912
Underwriters and Distributors of Public Utility and Industrial Securities
39 S. La Salle Street
CHICAGO
NEW YORK
SAN FRANCISCO

One of a series of "gas" advertisements which are appearing in metropolitan newspapers. Obviously, the appeal is to the investor

...dvertisement was developed from an ...illustration given in the A. G. A. ...advertising copy service. Ingenuity ...a equals a striking advertisement

Four advertisements of a series used in New Orleans, La., to educate the people of the city on the various aspects of natural gas service


Natural GAS
New Orleans is entering into her first winter's Natural Gas experience.
New Orleans Public Service Inc.
You Don't Deliver Your Own Gas
New Orleans Public Service Inc.
You Remember the Extremely Cold Days
New Orleans Public Service Inc.
"DINGBATS"
New Orleans Public Service Inc.

At the left is Blue Star Home No. 1, and at the right Home No. 2—Fall River, Mass.

Fall River Has Second Blue Star Home Exhibit

A VERY successful Blue Star home exhibit was conducted in Fall River, Mass., during the week of June 23-30 when A. H. Leeming and Sons, contractors, and the Fall River Gas Works Co. cooperated in the annual Home Beautiful exhibit sponsored by the Fall River *Herald-News*.

Of the five homes exhibited, two were Blue Star homes and were designated as No. 1 and No. 2 of the exhibit. The homes were both Colonial cottages, built to sell at moderate prices, $6600 and $7500 respectively, and were planned and built especially for exhibition purposes at Leemingville, a suburb. Plans were approved by the Fall River Gas Works Co. which specified sizes and locations for gas piping, outlets, and flues. House insulation was also specified.

In addition to adequate flues, piping, outlets, and house insulation, Blue Star specifications in Fall River include the following minimum appliance requirements: Gas range, gas house heater, and automatic gas water heater. In the Blue Star homes in Leemingville, however, were also gas refrigerators, incinerators, fireplace heaters, and model laundries equipped with gas ironer, gas dryer, and washer. Home No. 1 was equipped with a gas-fired boiler, while in the other a conversion burner was installed.

The kitchens of both homes were furnished in color with gas range, refrigerator, sink, and other equipment in harmony.

Perhaps the greatest interest was shown in the basements which were painted and finished as attractively as the rest of the homes. Much of the space was devoted in each basement to a children's playroom completely equipped with toys. The rest of the basement in each home was partitioned off and equipped as a model home laundry.

An extensive newspaper advertising campaign was run cooperatively by the gas company and the builders. This advertising was designed to accomplish two things; first, to get across to the public the significance of the Blue Star and second, to get people out to the homes. Each house was marked by an illuminated Blue Star which could be seen for several blocks. The total attendance for the eight days of the exhibit was about 20,000.

As the visitors entered the homes, they were greeted by hostesses who conducted them through and explained the various gas appliances and other equipment. In the laundry of one home, ironing demonstrations were conducted every day. Descriptive literature on the gas appliances exhibited was kept on hand for distribution.

The hostesses and other representatives succeeded in securing a very good list of prospects.

(Continued on page 496)

Statistical Data on Gas Industry for First Five Months of 1929

By PAUL RYAN

AN increase of 11 per cent in gas sales for May, 1929, as compared with May, 1928, is indicated by the first 96 companies reporting to the Statistical Department of the American Gas Association. As of May 31, 1929, the customers of these companies aggregated 9,522,956 which is an increase of 2.5 per cent from the corresponding date of the preceding year.

In New England sales of gas for all purposes registered an increase of over eight per cent for the month of May and of more than six per cent for the five months ending with May.

In this territory, as throughout the country generally, the most marked expansion occurred in sales of gas for industrial-commercial uses and for domestic house heating. For the five-month period of 1929 gas house heating sales increased 61 per cent in Massachusetts, while in Connecticut gas sold for house heating purposes gained 118 per cent over the same period of 1928.

The Middle Atlantic and South Atlantic regions continued to show relatively smaller increases than other sections, the gain in these two regions amounting to less than two per cent for the five-month period.

In the East North Central group May sales were 11 per cent above a year ago, but in this region also relatively the largest gains were effected in industrial-commercial and house heating sales. In Wisconsin industrial-commercial sales for May were 14 per cent above May of the preceding year; in Illinois the gain was 15 per cent while in Michigan industrial-commercial sales increased by nearly 30 per cent.

The data on gas produced and purchased for distribution by these 96 companies show the following significant trends for the five-month period:

1. A 6 per cent decrease in water gas produced.

2. A 12 per cent decrease in coal gas produced.

3. A 39 per cent increase in coke oven gas produced.

4. A 22 per cent increase in coke oven gas purchased from coke and steel companies operating by-product coke oven plants.

Statistical Department—American Gas Association

COMPARATIVE STATISTICS OF 96 GAS COMPANIES FOR MAY 1929—TOTAL UNITED STATES
(96 COMPANIES)

	MONTH OF MAY			FIVE MONTHS ENDING MAY 31		
	1929	*1928*	*Percent Increase*	*1929*	*1928*	*Percent Increase*
(1) Customers	9,522,956	9,294,365	2.5	See May		
(2) Gas Sales (MCF)	37,028,738	33,357,122	11.0	194,594,619	177,949,854	9.4
(3) Revenue ($)	35,360,932	33,124,668	6.8	184,128,426	176,234,988	4.5
(4) Gas Produced (MCF)						
(a) Water Gas	15,020,281	16,302,407	—7.9	84,011,310	89,083,397	—5.7
(b) Coal Gas	3,160,848	3,606,780	—12.4	15,898,966	18,035,514	—11.9
(c) Coke Oven Gas	3,375,575	2,363,004	42.9	16,212,239	11,698,140	38.6
(d) Oil Gas	2,489,331	2,227,277	11.8	15,151,508	13,066,602	16.0
(e) Total Gas Produced	24,046,035	24,499,468	— 1.9	131,274,023	131,883,653	—0.5
(5) Coke Oven Gas Purchased	8,711,780	6,766,334	28.8	40,715,600	33,373,882	22.0
(6) Total Mfd. Gas Produced & Purchased	32,757,815	31,265,802	4.8	171,989,623	165,257,535	4.1
(7) Natural Gas Purchased	7,584,535	5,660,865	34.0	46,288,843	32,678,223	41.7
(8) Total Gas Produced and Purchased	40,342,350	36,925,667	9.2	218,278,466	197,935,758	10.3
GROUP A. NEW ENGLAND STATES (21 COMPANIES)						
(1) Customers	1,008,204	987,517	2.1	See May		
(2) Gas Sales (MCF)	2,797,871	2,582,926	8.3	14,350,536	13,510,954	6.2
(3) Revenue ($)	3,320,246	3,116,591	6.5	16,753,837	16,048,585	4.4
(4) Gas Produced (MCF)						
(a) Water Gas	1,274,357	1,467,574	—13.2	6,795,474	7,523,128	—9.7
(b) Coal Gas	639,615	789,271	—19.0	3,206,434	3,766,275	—14.9
(c) Coke Oven Gas	247,365	237,197	4.3	1,172,189	1,172,971	—0.1
(d) Total Gas Produced	2,161,337	2,494,042	—13.3	11,174,097	12,462,374	—10.3
(5) Coke Oven Gas Purchased	955,258	472,729	102.1	4,642,187	2,434,874	90.7
(6) Total Gas Produced & Purchased	3,116,595	2,966,771	5.1	15,816,284	14,897,248	6.2

GROUP B—MIDDLE ATLANTIC STATES—(24 COMPANIES)

	MONTH OF MAY			FIVE MONTHS ENDING MAY 31		
	1929	*1928*	*Percent Increase*	*1929*	*1928*	*Percent Increase*
(1)Customers	3,734,848	3,679,664	1.5	See May		
(2) Gas Sales (MCF)	11,918,422	11,269,246	5.8	61,185,572	60,373,913	1.3
(3) Revenue ($)	13,561,727	12,920,564	5.0	69,465,892	69,022,110	0.6
(4) Gas Produced (MCF)						
(a) Water Gas	7,580,852	8,093,576	—6.3	42,520,232	45,028,814	—5.6
(b) Coal Gas	783,106	1,020,113	—23.2	4,245,817	5,424,382	—21.7
(c) Coke Oven Gas	1,753,296	1,051,222	66.8	8,531,458	5,151,941	65.3
(d) Total Gas Produced	10,117,254	10,164,911	—0.5	55,297,507	55,605,137	—0.6
(5) Coke Oven Gas Purchased	2,287,223	1,761,823	29.8	10,870,761	8,818,838	23.3
(6) Total Mfd. Gas Produced & Purchased	12,404,477	11,926,734	4.0	66,168,268	64,423,975	2.7

GROUP C—EAST NORTH CENTRAL STATES—(26 COMPANIES)

(1) Customers	2,435,640	2,339,658	4.1	See May		
(2) Gas Sales (MCF)	10,134,283	9,157,147	11.1	49,826,826	45,267,768	10.1
(3) Revenue ($)	9,475,547	8,734,878	8.5	46,574,622	43,542,978	7.0
(4) Gas Produced (MCF)						
(a) Water Gas	3,734,566	3,790,171	—1.5	20,958,898	19,509,700	7.4
(b) Coal Gas	1,518,903	1,452,199	4.6	7,387,207	7,112,343	3.9
(c) Coke Oven Gas	1,143,559	838,534	36.4	5,390,836	4,166,925	29.4
(d) Oil & Natural Gas	646	261	—	3,204	1,676	—
(e) Total Gas Produced	6,397,674	6,081,165	5.2	33,740,145	30,790,644	9.6
(5) Coke Oven Gas Purchased	4,394,688	3,609,308	21.8	20,311,276	17,789,362	14.2
(6) Total Mfd. Gas Produced & Purchased	10,792,362	9,690,473	11.4	54,051,421	48,580,006	11.3
(7) Natural Gas Purchased	41,998	39,196	7.1	197,901	208,265	—5.0
(8) Total Gas Produced & Purchased	10,834,360	9,729,669	11.4	54,249,322	48,788,271	11.2

GROUP D—WEST NORTH CENTRAL STATES (9 COMPANIES)

(1) Customers	540,322	529,182	2.2	See May		
(2) Gas Sales (MCF)	1,890,687	1,758,914	7.5	9,247,082	8,868,952	4.3
(3) Revenue ($)	1,905,307	1,759,170	8.3	9,078,011	8,810,944	3.0
(4) Gas Produced (MCF)						
(a) Water Gas	1,152,575	1,009,443	14.2	5,834,954	5,436,571	7.3
(b) Coal Gas	215,894	218,314	—1.1	1,045,105	1,100,275	—5.0
(c) Coke Oven Gas	174,903	178,374	—2.0	844,129	931,231	—9.4
(d) Total Gas Produced	1,543,372	1,406,131	9.8	7,724,188	7,468,077	3.4
(5) Coke Oven Gas Purchased	306,780	305,786	0.3	1,515,952	1,383,851	9.5
(6) Total Mfd. Gas Produced & Purchased	1,850,152	1,711,917	8.0	9,240,140	8,851,928	4.4

GROUP E—SOUTH CENTRAL AND MOUNTAIN STATES (3 COMPANIES)

(1) Customers	182,546	176,679	3.3	See May		
(2) Gas Sales (MCF)	1,158,836	643,718	80.0	5,771,856	3,732,411	54.6
(3) Revenue ($)	600,465	629,173	—4.6	3,344,677	3,648,881	—8.3
(4) Gas Produced (MCF)						
(a) Water Gas	6,134	556,024	—98.9	59,431	3,217,233	—98.2
(b) Coal Gas	3,330	126,883	—97.4	14,403	632,239	—97.7
(c) Total Gas Produced	9,464	682,907	—98.6	73,834	3,849,472	—98.0
(5) Coke Oven Gas Purchased		28,850	—	—	231,130	—
(6) Total Mfd. Gas Produced & Purchased	9,464	711,757	—98.7	73,834	4,080,602	—98.2
(7) Natural Gas Purchased	1,459,638	—	—	7,331,688	—	—
(8) Total Gas Produced & Purchased	1,469,102	711,757	106.4	7,405,522	4,080,602	81.5

GROUP H—SOUTH ATLANTIC STATES (7 COMPANIES)

(1) Customers	400,637	392,052	2.2	See May		
(2) Gas Sales (MCF)	1,863,824	1,799,914	3.6	9,915,878	9,723,209	2.0
(3) Revenue ($)	1,736,734	1,714,169	2.9	9,263,685	9,203,909	0.6
(4) Gas Produced (MCF)						
(a) Water Gas	1,134,647	1,260,366	—10.0	7,091,239	7,736,078	—8.4
(5) Coke Oven Gas Purchased	767,831	587,838	30.6	3,375,424	2,715,827	24.3
(6) Total Mfd. Gas Produced & Purchased	1,902,478	1,848,204	3.0	10,466,663	10,451,905	0.1

GROUP I—PACIFIC COAST STATES (6 COMPANIES)

(1) Customers	1,220,759	1,189,613	2.6	See May		
(2) Gas Sales (MCF)	7,264,815	6,145,257	18.2	44,296,869	36,472,647	21.5
(3) Revenue ($)	4,760,906	4,250,123	12.0	29,647,702	25,957,581	14.2
(4) Gas Produced (MCF)						
(a) Water Gas	137,150	125,253	9.5	751,083	631,873	18.9
(b) Coke Oven Gas	56,452	57,677	—2.1	273,627	275,072	—0.5
(c) Oil Gas	2,488,685	2,227,016	11.8	15,148,304	13,064,926	16.0
(d) Total Mfd. Gas Produced	2,682,287	2,409,946	11.3	16,173,014	13,971,871	15.8
(5) Natural Gas Purchased	6,082,899	5,621,669	8.2	38,759,254	32,469,958	19.4
(6) Total Gas Produced & Purchased	8,765,186	8,031,615	9.1	54,932,268	46,441,829	18.2

COMPARATIVE STATISTICS OF THE GAS INDUSTRY IN THE STATE OF MASSACHUSETTS FOR MAY 1929
(Data Reported by 11 companies whose sales equal 81% of total gas sales in Massachusetts)

	MONTH OF MAY			FIVE MONTHS ENDING MAY 31		
Customers	*1929*	*1928*	*Percent Increase*	*1929*	*1928*	*Percent Increase*
Domestic	600,171	589,913	1.7			
Householeating	2,623	1,623	61.6			
Industrial and Commercial	17,718	15,720	12.7		See May	
Miscellaneous	113	10				
Total (10 Companies)	620,625	607,266	2.2			
Grand Total (11 Companies)	654,032	641,182	2.0			
Gas Sales (MCF)						
Domestic	1,240,823	1,175,789	5.5	6,019,706	5,999,973	0.3
Householeating	69,804	45,704	52.7	831,532	514,460	61.6
Industrial and Commercial	305,873	296,773	3.1	1,575,864	1,538,773	2.4
Miscellaneous	18,157	19,495		118,767	122,679	
Total (10 Companies)	1,634,657	1,537,761	6.3	8,545,869	8,175,885	4.5
Grand Total (11 Companies)	1,719,877	1,616,007	6.4	8,982,381	8,589,638	4.6
Gas Revenue (Dollars)						
Domestic	1,581,893	1,505,548	5.1	7,662,493	7,657,755	0.1
Householeating	51,902	33,870	53.2	666,877	407,319	63.7
Industrial and Commercial	314,992	311,492	1.1	1,635,811	1,616,248	1.2
Miscellaneous	15,221	16,538		84,883	94,089	
Total (10 Companies)	1,964,008	1,867,448	5.2	10,050,064	9,775,411	2.8
Grand Total (11 Companies)	2,061,204	1,958,123	5.3	10,537,185	10,248,232	2.8
Gas Produced and Purchased (MCF)						
Gas Produced						
(a) Water Gas Made	910,559	856,343	6.3	4,856,894	4,523,919	7.4
(b) Coal Gas Made	493,430	517,642	—4.7	2,473,960	2,453,158	0.8
(c) Total Gas Produced	1,403,989	1,373,985	2.2	7,330,854	6,977,077	5.1
Coke Oven Gas Purchased	503,610	472,729	6.5	2,440,900	2,434,874	0.2
Total Produced and Purchased	1,907,599	1,846,714	3.3	9,771,754	9,411,951	3.8

COMPARATIVE STATISTICS OF THE GAS INDUSTRY IN THE STATE OF ILLINOIS FOR MAY 1929
(Data reported by 7 companies whose sales are over 80% of the total gas sales in Illinois)

	MONTH OF MAY			FIVE MONTHS ENDING MAY 31		
Customers	*1929*	*1928*	*Percent Increase*	*1929*	*1928*	*Percent Increase*
Domestic	1,178,928	1,158,204	1.8			
Householeating	9,041	7,737	16.9			
Industrial and Commercial	71,161	69,274	2.7		See May	
Miscellaneous	209	198	—			
Total	1,259,339	1,235,413	1.9			
Gas Sales (MCF)						
Domestic	3,020,100	2,873,512	5.1	14,978,535	14,256,549	5.1
Householeating	202,276	162,224	24.7	1,962,516	1,562,542	25.6
Industrial and Commercial	1,495,054	1,298,454	15.1	7,083,357	6,313,228	12.2
Miscellaneous	12,015	9,457	—	65,254	56,342	—
Total	4,729,445	4,343,647	8.9	24,089,662	22,188,661	8.6
Gas Revenue (Dollars)						
Domestic	3,292,111	3,141,426	4.8	16,254,472	15,790,769	2.9
Householeating	162,797	129,628	25.6	1,533,694	1,224,541	25.2
Industrial and Commercial	1,121,959	1,022,112	9.8	5,325,808	5,214,309	2.1
Miscellaneous	7,695	11,894	—	40,546	40,044	—
Total	4,584,562	4,305,060	6.5	23,154,520	22,269,663	4.0
Gas Produced and Purchased (MCF)						
Gas Produced—						
(a) Water Gas Made	1,463,304	2,023,043	—27.7	9,978,564	11,389,767	—12.4
(b) Coal Gas Made	62,396	104,229	—40.1	341,422	536,768	—36.4
(c) Coke Oven Gas Made	850,888	749,158	13.6	4,135,320	2,967,091	39.4
(d) Total Gas Produced	2,376,588	2,876,430	—17.4	14,455,306	14,893,626	—2.9
Coke Oven Gas Purchased	2,648,681	1,817,332	45.7	11,750,155	9,156,197	28.3
Total Mfd. Gas Produced & Purchased	5,025,269	4,693,762	7.1	26,205,461	24,049,823	9.0
Natural Gas Purchased	8,105	7,321	10.7	35,174	37,759	—6.8
Total Gas Produced & Purchased	5,033,374	4,701,083	7.1	26,240,635	24,087,582	8.9

Booklet on Basic Industries of Pennsylvania

A RECENT bulletin of the Pennsylvania State College is entitled "The Economic Outlook for the Basic Industries of Pennsylvania." This is a message of facts concerning the great economic importance of Pennsylvania's mining and mineral industries to the life and prosperity of the state.

In the booklet there is a general discussion of the various problems faced by industries in the state, as well as a comprehensive outline of the program of the State School of Mines and Metallurgy.

Extra copies of this interesting booklet can be secured from the Dean, School of Mines and Metallurgy, State College, Pennsylvania.

The Monthly Tabloid—Personal and Otherwise

J. C. Diehl

John C. Diehl has been made chief engineer of American Meter Company, effective July 1.

Since 1919, Mr. Diehl has been engineer with the Metric Metal Works Division at Erie. In that capacity he has been in charge of the Erie experimental laboratory, specializing in large volume, high-pressure measurement.

As chief engineer of American Meter Company, Mr. Diehl will coordinate all experimental activities now being carried on in the several factories. He will also supervise the introduction of technical improvements in products, and promote in general any findings of value to the practical application of measurement engineering.

A frequent contributor of technical articles to gas and oil journals, he is also the author of the revised edition of the Natural Gas Handbook, 1927. He assisted the late H. P. Westcott in the Handbook of Natural Gas, 3rd edition, 1920, and compiled 1927 edition; Measurement of Gas and Liquids by Orifice Meter, 2d edition, 1922; Handbook of Casinghead Gas, 3d edition, 1922.

Mr. Diehl graduated in 1905 from Pennsylvania College, and in 1910 from Massachusetts Institute of Technology. From 1905 to 1908 he served as engineer in the Construction Department of the Pennsylvania Railroad, and from 1910 to 1917 as engineer in the Maintenance of Way Department. He served with the 25th Engineers, U. S. A., in the World War from 1917 to 1919.

R. J. Daugherty has been made director of the information service of the Empire Companies, taking the position left vacant by the recent resignation of Keith Clevenger. Mr. Clevenger has accepted a position with the American Gas Association as director of publicity and advertising.

For the past two years Mr. Daugherty has been employed in the public relations department of the natural gas department of the Empire organization.

Thomas W. Stone has been elected a vice-president of the Western Gas Construction Co., Fort Wayne, Ind.

Mr. Stone graduated from the Ohio State University in 1902, entered the employ of the Western Gas in June of the same year, and has served during the ensuing 27 years in the capacity of draftsman, superintendent of erection, assistant engineer, and chief engineer.

E. E. Schafer has resigned as sales manager of the Peoples Power Co., Moline and Rock Island, Ill., after many years of service. Effective July 1, H. Parker Weeks has been made sales supervisor of the company.

Charles E. Eble, assistant manager of the Accounting Department of the Consolidated Gas Company of New York, N. Y., has been promoted to manager of the department.

Michael J. Miley, who has been chief clerk of the Accounting Department of the Consolidated Gas Co. of New York, has been made assistant manager of the department.

George L. Harrison, who is manager of the Accounting Department of the Astoria Light and Heat Co., has assumed additional duties as assistant manager of the Consolidated Gas Co.'s Accounting Department.

Robert E. Livingston, director of information for the Consolidated Gas Company of New York, N. Y., has announced the removal of his offices from 1 Madison Ave. to 4 Irving Place, New York, N. Y.

Charles A. Learned, manager of the Meriden district of the Connecticut Light & Power Co., and one of the best known gas engineers in the East, died at Meriden on June 25 after an illness of several months. Mr. Learned was taken ill in the winter and went to Johns Hopkins Hospital in Baltimore, Md., for observation and treatment. There he underwent an operation and remained for two months under treatment. He returned to his home about a month ago. At first he seemed to gain a little in strength but later during the exceedingly warm spell he had been growing weaker and weaker.

Mr. Learned was one of the "original thirteen" gas men who formed the National Commercial Gas Association, which is now the American Gas Association. At the time of his death he was treasurer of the state gas and state electric associations, positions he had held for more than 20 years. Mr. Learned was deeply interested in civic matters.

Paul F. McBride has been made general manager of the Southern Cities Distributing Co., subsidiary of the Arkansas Natural Gas Corp., Shreveport, La.

Prior to his employment with the Arkansas Natural Gas Corp. Mr. McBride was associated with the Cities Service Gas Co. and the Empire Oil & Refining Co. Mr. McBride has been with the Arkansas Natural Gas Corp. since its organization in April, 1928, having been located at Shreveport in the capacity of manager in the purchasing, warehouse, transportation, and telephone departments of the company.

Affiliated Association Activities

Wisconsin Utilities Association

A. J. Bohl

G. W. VAN DERZEE made his first address as President of the Wisconsin Utilities Association at the annual convention of its Accounting Section held in Sheboygan, June 20 and 21. In the course of his remarks, Mr. Van Derzee declared that the object of the utility industry for the next year should be to mind its own business, industriously and intelligently, in order that the public will continue to get the best service at the lowest practicable cost.

More than 100 delegates heard a program replete with timely information and interesting discussion. The chairman of the section, Louis T. Smith, presided. The officers elected for the new year are: Chairman, A. J. Bohl, auditor of The Milwaukee Electric Railway & Light Co.; and vice-chairman, J. E. Gray, auditor of the Wisconsin Power & Light Co.

Empire State Gas & Electric Association

F. M. Houston

THERE were 125 in attendance at the annual meeting of the Commercial Section of this Association held at Niagara Falls, N. Y., June 20 and 21. John L. Haley, chairman, presided. Among the subjects considered were merchandising policies, Diesel engine installations, domestic gas sales promotion, rural business, new commercial opportunities, selling industrial gas, merchandise sales cooperation, radio merchandising, and water heating.

F. M. Houston, of Oneonta, was elected chairman, and M. E. Skinner, of Albany, vice-chairman, of the Section for 1929-30.

The twenty-fifth annual meeting of the Empire State Gas & Electric Association will be held at Saranac Inn, Upper Saranac, N. Y., on September 19 and 20. It is expected that more than 200 executives and department heads will attend the sessions.

A fine program is being arranged for the two morning business sessions, each section of the Association being represented by prominent speakers who will discuss problems in all departments of the business including electrical engineering, gas engineering, gas and electric commercial practices, women's activities, accident prevention, accounting, and electric meter engineering.

A program of entertainment and recreation is also being arranged, consisting of a golf tournament for the men and women, boat rides, auto rides, a banquet, and president's reception.

Michigan Gas Association

A. I. Snyder

THE annual convention of this Association, held at Mackinac Island, Michigan, July 1, 2, 3, was both interesting and delightful. The President, F. A. Newton, in a masterly address, reviewed the present condition of the industry, and predicted that aggressive sales efforts would undoubtedly bring results outstripping every record the industry has known.

Among the speakers on the program were Mrs. Siegel W. Judd, President of the Michigan League of Women Voters; W. J. Hagennah, vice-president of Byllesby Engineering & Management Corp.; Oscar H. Fogg, President of the American Gas Association; A. C. Marshall, vice-president and general manager of the Detroit Edison Co.; Arthur W. Stace, director of the Michigan Committee on Public Utility Information; Assistant Professor E. S. Pettyjohn, Department of Engineering Research, University of Michigan, and J. E. Spindle, of the Grand Rapids Gas Co.

The following were elected officers of the association: A. I. Snyder, of Detroit, President; Professor Alfred H. White, of Ann Arbor, vice-president; and A. G. Schroeder, of Grand Rapids, secretary and treasurer. The election of Professor White is a fitting recognition of his many years of service to the association.

Colorado Utilities Association

AT Glenwood Springs, Colorado, September 2, 3, and 4, 1929, will be held the twenty-sixth annual convention of the Colorado Utilities Association. Glenwood Springs has for most of the life of this Association been its annual conference grounds. The place is well-chosen. Situated on the main line of one of the

transcontinental railways between Denver and Salt Lake City and on the banks of the Colorado River, it offers unusual advantages for both study of problems and relaxation from work.

During the past year the utility industry in Colorado has taken many significant steps in establishing a stronger position with reference to the distribution and sale of gas. This has chiefly been in connection with natural gas.

The Colorado Association, as a first step in more satisfactorily meeting this situation, has established affiliation with the American Gas Association. Strong features on the program are, therefore, being arranged which will constitute an appeal to gas men of the entire Rocky Mountain Region and should insure their presence. It is expected that Vice-president B. J. Mullaney and Managing Director Alexander Forward of the American Gas Association will attend.

The program will include subjects of interest to both gas and electric men. President M. S. Sloan and Managing Director Paul S. Clapp of the National Electric Light Association will address the convention. The presence of one or more of Colorado's chief educators is assured. James B. Wootan, of Chicago, and other editors of utility magazines, will present important phases of local and national problems confronting the industry. William J. Hagennah, vice-president, Byllesby Engineering and Management Corp., has agreed to bring to the convention one of his virile and interesting studies on regulation and relative issues.

Canadian Gas Association

THE Canadian Gas Association maintains its splendid record of making each succeeding convention excel predecessors. The 22d annual convention, held in Ottawa, June 13 and 14, was a most instructive and enjoyable affair. The program included papers on subjects of timely interest presented by authorities.

K. L. Dawson

The following officers were elected: President, Kenneth L. Dawson, superintendent, gas department, Nova Scotia Light & Power Co., Ltd., Halifax, N. S., 1st vice-president, A. T. Leavitt, President, Hamilton By-Product Coke Ovens, Ltd., Hamilton, Ont.; 2nd vice-president, Hugh McNair, manager of gas utility, Winnipeg Electric Co., Winnipeg, Man.; secretary-treasurer, G. W. Allen, consulting survey engineer, 21 Astley Ave., Toronto, Ont.

The following were elected as members of the Executive Committee: J. S. Norris, Arthur Hewitt, J. M. H. Young, C. C. Folger, V. S. McIntyr, D. R. Street, J. J. Humphreys, and C. A. Jefferis.

Halifax, N. S., was tentatively selected as the place for the 1930 convention.

Pennsylvania Natural Gas Men's Association

G. E. Whitwell

THE annual meeting and election of directors and officers of the Pennsylvania Natural Gas Men's Association was held on July 1, at the Pittsburgh Field Club, where George W. Ratcliffe, retiring president of the association, entertained the members as his guests. Luncheon was served to about 22 members and a very pleasant golf party followed.

Some additional members joined the party for dinner at 6:30, which was followed by the annual meeting and election of directors. The following directors were elected for the year 1929-1930:

T. B. Gregory, vice-president, Columbia Gas & Electric Corp.; S. W. Meals, President, Carnegie Natural Gas Co.; B. D. Phillips, vice-president and gen'l mgr., T. W. Phillips Gas and Oil Co.; F. R. Phillips, vice-president, Philadelphia Company.; Geo. W. Ratcliffe, President, Manufacturers Light & Heat Co.; E. S. Templeton, treasurer, Greenville Natural Gas Co.; J. B. Tonkin, vice-president and gen'l. mgr., Peoples Natural Gas Co.; Geo. E. Welker, President, United Natural Gas Co.; Geo. E. Whitwell, vice-president in charge of sales, Equitable Gas Co.; E. W. Williamson, assistant gen'l mgr., Peoples Natural Gas Co.; Geo. Wittmer, Jr., treasurer, Wittmer Oil and Gas Properties.

Immediately following the annual meeting, the new directors met and elected as officers for the ensuing year the following:

Geo. E. Whitwell, President; Geo. E. Welker, vice-president and B. H. Smyers, Jr., secretary-treasurer.

Pacific Coast Gas Association

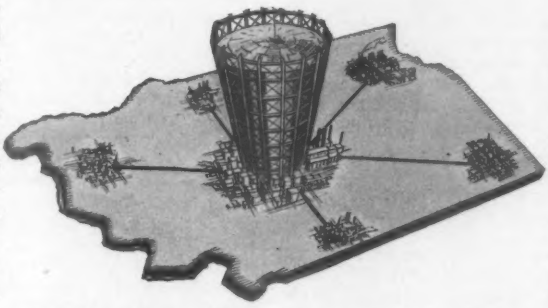
THIS year the Pacific Coast Gas Association will hold its thirty-sixth annual convention in the West's most famous resort, Hotel Del Monte on the Monterey Peninsula. The convention will run from September 10 to 13, inclusive, following immediately after the National Amateur Golf Championship which is to be played on one of the hotel courses.

(Continued on page 504)

Natural Gas Department

S. W. MEALS, Chairman
E. J. STEPHANY, Secretary
H. C. MORRIS, Vice-Chairman

The Status of the Investigation of Pipe Line Protection Against Corrosion



THE gas industry is attaching great importance to the question of pipe line protection against corrosion, especially since the rapid development of long-distance pipe lines in natural gas territories, and the so-called super-gas systems which are transporting manufactured gas for hundreds of miles.

Tests of protective coatings for pipe lines are to be made by the American Gas Association in cooperation with the Bureau of Standards, as pointed out in this article. A plan of testing protective coatings for pipe lines was formulated by representatives of coating manufacturers, representatives of the American Gas Association, and representatives of the Bureau of Standards at a meeting held in Washington, D. C., on June 3.

J. K. Crowell, of Mount Vernon, N. Y., is chairman of the A.G.A. Committee on Pipe Coating and Corrosion Research, which is in charge of this work for the gas industry.—Editor's Note.

THE enormous capital invested in underground pipe systems and the well-established fact that this pipe is being attacked by the surrounding soil has resulted in much discussion by those who are responsible for the maintainance of these pipe systems. Every gas engineer who has a pipe system to protect must decide whether or not it is economical to apply some kind of coating to his pipes, and if he feels that protection is necessary, he must choose the kind of coating that he will use. In attempting to choose the coating he finds that his principle source of information is the coating manufacturer. Here he finds a number of conflicting and often well-grounded opinions as to what a protective coating should be, and his final decision as to what he will use will probably depend largely upon his source of information. The characteristics and properties of a material which is available and cheap and which will best protect a pipe are not definitely known, and they may depend upon the kind of soil in which the pipe is laid. For these reasons any accelerated test of a coating is at this stage open to question.

The following extracts from *Technologic Paper No. 368* summarize briefly the work of the Bureau of Standards on soil corrosion of ferrous metals and its studies on protective coatings up to 1928.

"After a number of years of study of corrosion due to stray electric currents in the earth by the American Committee on Electrolysis and the Bureau of Standards, it became evident that in some cases the cause of observed corrosion could not be decided until it was known whether serious corrosion could occur in uncontaminated soil where no stray currents were present.

"The Bureau of Standards, therefore, undertook to conduct an investigation of the relation of soils to buried pipe. The studies of soil corrosion were begun in 1922, and the field work has been so planned that specimens will be removed at about two-year intervals for a period of 10 years. Of the specimens buried, about one-third have been removed for examination. The work will not be finished for several years.

"The data indicate that in certain regions soil corrosion is an active enemy of buried

pipe lines and that the use of some form of protective coating is desirable under a number of soil conditions.

"Because the rates of corrosion so far observed may not continue and because the rate for one material may change more than the rate for another, no conclusions can be drawn at this time as to the ultimate life of any of the materials under test, nor of the relative merits of materials that are nearly alike.

"At the time the first specimens of uncoated pipe were buried, a few specimens of bituminous-coated pipe were also buried. These coatings were selected and prepared by a manufacturer of steel pipe who had been experimenting with protective coatings for a number of years.

"Later it appeared that a more extensive study of protective coatings should be made, and several large producers of asphalts and tars were consulted as to materials suitable for pipe protection. The selection, preparation, and laboratory testing of the coating materials was done under the supervision of E. H. Berger, then asphalt chemist of the Bureau of Standards.

"As there are numerous varieties of each type, it was decided to limit the investigation to a few types of materials, which could be applied by the hot dipping process then commercially used. Coatings and methods in use for the protection of gas and oil lines in the field and already laid were not considered within the scope of this investigation.

"Six asphalt coatings and three tar or pitch coatings were considered sufficient for ascertaining the value and usefulness of bituminous dipped piped coatings. The asphalt coatings were made from the straight residues from Mexican, Texas, and California crude petroleums, and from Mid-Continent asphalt combined with gilsonite, with gilsonite and stearine pitch, and with the residue from Illinois crude oil. The asphalt coatings were all of the blown type and were prepared by blowing the respective crudes with air at elevated temperatures until the required characteristics were obtained.

"The tar or pitch coatings were of three different kinds. The first was a low-melting, soft coal tar pitch produced from high carbon coal tar, the second was refined low-carbon coal tar from coke ovens, and the third was refined water gas tar manufactured especially for coating cast-iron pipe.

"The pipes were dipped twice so as to reduce the tendency to form pinholes. After pulling the first time, the pipes were allowed to cool about one minute and then were immersed again in the molten bath and allowed to remain from 10 to 30 seconds. They were then again drawn slowly from the bath as before and allowed to cool. The cool specimens were dusted with Portland cement and wrapped in thin waxed paper, which was followed by ordinary brown wrapping paper.

"The following conclusions apply only to the particular materials and methods of application included in the tests and may be noted as a result of the examination of the first sets of specimens removed in 1926. (1) The thin bituminous coatings add somewhat to the life of a pipe, but in many soils they deteriorate and do not furnish adequate protection against soil corrosion. (2) The bond between the coating and the pipe seems to hold better in the pitch coatings, but certain of these coatings are friable and easily scrapped off the pipe. (3) The thick pitch coating has a tendency to creep or flow, to leave the upper part exposed, and to allow stones and pebbles to penetrate the coating. It also tends to become brittle, but this may not affect its protective value when the protected pipes are not exposed. (4) Reinforcing the pitch coating by wrapping the pipe with a loosely woven fabric which can be impregnated with the pitch adds materially to the value of the protection by keeping the coating in place. (5) There is some evidence of deterioration of the bituminous materials in some soils, and in such soils a bitumen-impregnated fabric coating will not afford permanent protection against soil action. (6) A coating better than any of the dip coatings under test is needed for a number of soil conditions."

On April 12, 1928, Dr. Gordon N. Scott was appointed by the American Petroleum Institute as a research associate to work at and with the cooperation of the Bureau of Standards. His first project was to make a corrosion survey of the entire petroleum industry. At a meeting of the American Petroleum Institute general committee on June 13, it was further decided that he should concentrate his efforts on the corrosion of pipe lines and tanks and study ways and means of mitigating it by the writing of codes of good practice in the application of coatings, the codes being formulated in cooperation with the corrosion committee of the American Petroleum Institute. A code for the application of hot bituminous coatings has been prepared for distribution among members of the American Petroleum Institute. Dr. Scott's report on his inspections of coatings in the field is published in Section 1 of the proceedings of the ninth annual meeting of the American Petroleum Institute.

Plans of the A.G.A., the A.P.I. and the Bureau of Standards for Work on Protective Coatings

On April 1, 1929, Dr. Scott Ewing was appointed research associate for the American Gas Association to work at the Bureau of Standards. At a meeting of representatives of the American Gas Association, the American Petroleum Institute, and the Bureau of Standards on January 4, the following division of the work between the associates of the two associations was agreed upon.

The American Gas Association's research associate is to:

(1) Develop, evaluate, and standardize methods of testing coatings. This is to include the development of a method of determining the changes in physical characteristics of coatings under the conditions to which they are subjected.

(2) Check laboratory tests with field experience by means of coated samples buried in representative soil classes.

(3) Make inspection of coatings already applied to pipe lines in urban territory only.

The American Petroleum Institute's research associate is to:

(1) Continue field investigation of protective coatings in suburban territory only, applied to both gas and oil lines.

(2) Develop codes for the application of various types of coatings.

(3) Make a study of the economic aspects of pipe line protection.

American Gas Association and Bureau of Standards Burial Test

At a meeting of the committee on Pipe Coatings and Corrosion of the American Gas Association and a representative of the Bureau of Standards on April 1, it was agreed that the Bureau of Standards would work on the first A.G.A. project given above and that the A.G.A. research associate should first get the burial tests of coatings applied to short lengths of pipe under way.

After conferring with representatives of most of the large coating manufacturers and with men at the Bureau of Standards who are familiar with coatings, a tentative outline of the proposed tests was prepared and sent to manufacturers. On June 3, a meeting was held at which coating manufacturers, the Bureau of Standards, the American Petroleum Institute, and the American Gas Association were represented. The original plan was revised until unanimous agreement was reached on almost all of the details. The following are the essential points of the plan that was finally adopted:

This picture is that of Dr. Scott Ewing, research associate for the American Gas Association, as pointed out in this article.

Dr. Ewing has had many years of experience in this line of work at the United States Bureau of Standards, and he is in possession of complete information which will be of great value.

The pipe on which the coatings will be applied will be full length two-inch pipe which will be supplied and shot-blasted by the National Tube Company. All of the pipe will be shot-blasted the same day. They will then be placed in a bin where they will be protected from the weather and dusted with powdered lime which will prevent them from rusting until the coating is applied. The field-applied coatings will be applied by the coating manufacturer at the Versailles plant of the National Tube Company. A representative of the American Gas Association will be present to note any facts he considers of importance concerning the coating material or the method of application.

The coated pipe will then be cut into two-foot lengths by the National Tube Company, which will be done without the use of oil and without injuring the coating for more than one inch on each side of the cut. The specimens will then be identified by stamping the pipe near each end with a steel die, each coating being identified with

a letter. The ends of the specimens will be protected with a tin can full of bitumen. The specimens of each coating will be stored in boxes until all of the other coatings have been applied.

In case the manufacturer has facilities for applying his coating by the shop method, and if he prefers to test his coating as a shop applied coating, the pipe will be primed immediately after it is shot-blasted with the priming material he sends to Versailles and the full-length pipe will be shipped to a point he designates. He will apply his coating to the full length pipe with a representative of American Gas Association present and will cut the pipe in two-foot lengths. The specimens will then be treated in the same way as those prepared at Versailles.

The specimens will then be shipped to Versailles or the Bureau of Standards and then to the places of burial where they will be laid crosswise in the bottom of a trench two to three feet deep. Four specimens of each coating will be buried in each location and they will be buried so that one specimen of each coating can be removed without disturbing the others. Bare sand-blasted pipes will also be buried in order to determine the corrosion rate on bare metal. There will be at least 12 burial locations and these will be chosen in the following soils: Miller clay, Susquehanna clay, Cecil clay loam, Tidal Marsh, Muck or Peat soils, Alkali soils and Cinders.

Coatings to be tested

The coatings to be tested are divided into two groups, namely:

Group I: Shop and field applied coatings that are now being used by gas companies, to be furnished by them, and special coatings which the American Gas Association or the Bureau of Standards may include.

The coatings of this group are considered by their users to be the best coatings for the particular conditions where they are used but are not all recommended as offering adequate protection for severe conditions. The fact that they are used on a large scale by the gas industry justifies testing them.

The users of these coatings will be asked to supply all the information they have regarding the coating material and samples of the material will be sent to the Bureau of Standards for further tests. A representative of the American Gas Association or the Bureau of Standards will be present at the time the pipe is coated to obtain all information he considers worth recording.

Group II: Shop and field applied coatings that are submitted by coating manufacturers.

The manufacturer agrees to the following:

1. That the proposed method of cleaning the pipe, applying the priming coat, and cutting the pipe is satisfactory to him and gives his product a fair test.

2. That the coating submitted by him is the product he recommends for soil conditions of the test and is applied in such a way as to give adequate protection under these conditions.

3. Every manufacturer is at liberty to use as many applications as he chooses and coat the pipe in any way he chooses, provided the average thickness of the coating is not more than 0.125 inch, and provided also that the coating is manufactured as a commercial protective coating and has been on the market and sold previous to June 1, 1929. The thickness of the coating will be determined by making 12 measurements with a depth gauge on a representative specimen, distributed as follows: four measurements equally distributed around the pipe four inches from each end, and four measurements equally distributed around the pipe midway between the ends.

4. The number of applications, the method of application and any other facts concerning the application of the coating that have a bearing on its value will be a part of the description of the coating. The description will also include the trade name of the coating, if any, and the name of the manufacturer who submits the coating. This information, together with any other data concerning the coating which the Bureau of Standards may obtain, may be published whenever the Bureau of Standards sees fit.

5. For each coating the manufacturer wishes to include in the test he will be required to pay the American Gas Association the sum of $200, to help defray the expense of testing. After the completion of the experiment if any of the fund is left, it will be redistributed among the manufacturers on an equitable basis.

Manufacturer's statements concerning the nature of their product must include the following:

A. Hot Applied Coatings.

a. Physical characteristics of final product as determined in accordance with A.S.T.M. standards. State approximate melting point (A.S.T.M. serial designation D36-26), Penetration at 32° F., 77° F. and 115° F. (A.S.T.M. serial designation D5-25), ductility (A.S.T.M. serial designation D113-26T) and solubility in carbon bisulphide (A.S.T.M. serial designation D4).

b. A description of such inhibitors as are used that will enable those interested in these tests to ascertain whether the specimen as tested is identical with the product as regularly produced.

c. The amount and kind of inert material added, if any.

d. If a pitch is used, the approximate percentage of free carbon and the method used in determining it.

e. Any other facts the manufacturer considers necessary for the identification of his material.

B. Cold Applied Coatings.

a. Asphalt emulsions. Follow the outline under A in describing the residue obtained by distilling the product as in A.S.T.M. serial designation D244-28T.

b. Cutbacks and primers of asphalt or pitch base. Follow the outline under A in describing the residue obtained by distilling the product as in A.S.T.M. serial designation D255–26T.

C. Coatings That Do Not Fall in the Above Classes.

The manufacturer will be expected to give the composition of the coating or specify methods for identifying the coating.

D. Fabrics if Any.

If an ordinary cotton fabric, state the name of the weave and weight. If a felt, state the approximate composition and weight.

E. Method of Application.

This should include the usual methods by which the coating is applied and the way it is proposed to coat the pipe in this test.

Manufacturers will start applying their coatings to the pipe about July 25, and it will take approximately two months to finish this part of the work. Immediately after the specimens are prepared, they will be buried. The time when the first set of specimens will be removed has not yet been determined, but it will probably be within a year of the date of burial. The interval between the first and second removal will be determined largely by the condition of the specimens that were first removed.

The results of the test should permit a more intelligent selection of coatings and indicate the essential features of a satisfactory coating. They will also enable manufacturers to secure data on their products which will be more definite than those usually procurable through observance of field experience and therefore more acceptable to prospective purchasers.

It is hoped that the results will also be of assistance in the development of laboratory tests which will identify satisfactory coatings.

Progress Report on Specifications for Cast Iron Pipe and Special Castings—A. S. A.

THE Sectional Committee on Specifications for Cast Iron Pipe was organized in 1926 under the auspices of what is now known as the American Standards Association; this Committee was sponsored by the American Gas Association, the American Society for Testing Materials, the American Water Works Association and the New England Water Works Association.

There are three Technical Committees dealing with Dimensions, Metallurgy, Processes and Tests, as well as Corrosion and Protective Coatings.

Dimensions

This Committee will seek to simplify the schedules by eliminating unnecessary sizes, weights, and patterns, making such tests and investigations as may be required to determine mooted questions.

Metallurgy, Processes, and Tests

To this Committee has been given the task of investigating pig iron and other raw materials entering into cast iron for pipes, melting practice in the casting of pipes, and acceptance tests relating to the strength of the pipes and the quality of metal in them.

Corrosion and Protective Coatings

To this Committee has been assigned the study of causes and mechanism of the corrosion

of cast-iron pipe exposed to soil or water, and of practicable methods of reducing or eliminating such corrosion so far as this can be done at the pipe shop.

Questionnaire

A great deal of the information to be collected is being obtained by means of a questionnaire which has been sent to over one thousand superintendents of water and gas plants, and the returns so far received show that much and valuable information is being obtained, much of it of a nature never before collected and which will deserve very careful study and require much work on account of its volume.

Trench Load Tests of Pipe

Under the direction of the Committee on Dimensions, trench load tests are being made at Iowa State College which will give definite information to an extent never before realized on some of the questions on earth loads on which there has been much discussion in the past. Work is under way on tests on the supporting strength of 8-inch and 20-inch pipe with and without internal pressures with different arrangements of bearings, both of single pieces and of jointed pieces, which will give better knowledge of the stresses in the pipe when in the ground under normal earth loads, under heavy cover, and when the support under the pipe is for any reason poor.

These tests include:

Internal pressure tests, including measurement of expansion of specimen while under test.
Falling ring impact tests.
Compression tests on full rings.
Compression tests on half rings.
Tension tests on half rings.
Flexure tests on rings with loads applied at six points equally spaced.
Charpy impact tests.
Brinnell hardness tests.

Tests on Water Corrosion of Pipe

Under the direction of the Committee on Corrosion and Coatings, tests are in progress at the Massachusetts Institute of Technology on corrosion in water of cast-iron pipe of various chemical compositions, the specimen being kept immersed up to a maximum time, under the program, of 300 days, and the water being allowed to run without interruption past the specimens which are kept rotating.

All Tests

On all of these tests the pipes come from foundries in different parts of the country and are not specimens picked for the tests but are the ordinary run of pipe, with the view that all tests should give information which will apply to average conditions. Complete information is recorded of all details of manufacture of each piece of pipe so that everything possible will be learned and published to connect cause and effect of all phenomena observed. Published reports will be made of the information available from the tests, from the questionnaire and otherwise, without waiting for the issuance of a final report, so that all information obtained will be available to those interested as completely and as early as possible.

Mid-West Industrial Council Holds Quarterly Meeting

THE Mid-West Industrial Gas Sales Council held its quarterly meeting on June 28 at Palmer House, Chicago, Ill. The meeting was very well attended, there being about 50 present.

The first of the three speakers on the program was T. V. Purcell, vice-president of The Peoples Gas Light and Coke Co., Chicago, Ill., who spoke on selling industrial gas. Mr. Purcell pointed out that the industry is now facing a situation similar to that at the time when the electric illumination was first introduced. Now the domestic cooking load is threatened by the inroads of the electric range. The situation is, however, not so serious at this time as there is now a very well-developed industrial and house heating load to take the place of any losses.

In conclusion the speaker made the suggestion to the managers of the gas company that they give their full support to the industrial men, as it is through the efforts of these men that the gas utility will be able to pay their dividends on money invested. As a matter of fact the industrial business is the best paying part of the modern gas company.

The second paper was presented by G. H. Head, of the Wisconsin Gas and Electric Co., and dealt with continuous core baking. The speaker described in detail the recently installed core ovens of the Nash Motor Co. From tests it has been found that from 0.54 to 0.58 cu.ft. of 525 B.t.u. gas were required per pound of wet sand. This showing was considerably better than that experienced with batch type ovens or ovens fired with other fuels than gas.

The last paper was given by Roger W. Jackson, of Maxon Premix Burner Co., on conversion jobs. The speaker showed by numerous examples that conversion jobs have a very definite and useful place in the sale of gas for industrial purposes. The discussion showed that a reliable conversion job, burner equipment and changes to furnaces, is the forerunner to complete gas use in any plant. In every case gas was retained for the work after the first conversion job had shown the advantages of the gas over all other fuels.

Accounting Section

F. H. PATTERSON, Chairman H. W. HARTMAN, Secretary J. L. CONOVER, Vice-Chairman

Maryland Adopts Uniform Classification

ORDER No. 14,572, case No. 2914, of the Public Service Commission of the State of Maryland calls for adoption by all gas companies in the State of the uniform classification of accounts recommended by the National Association of Railroad and Utility Commissioners.

The uniform classification of accounts has been in effect in Baltimore, Md., for some time, but this order puts it into effect in the entire state.

The order of the Commission reads as follows:

"It is, Therefore, this 20th day of June, in the year Nineteen Hundred and Twenty-nine, by the Public Service Commission of Maryland,

"ORDERED: (1) That the Commission hereby adopts as the uniform classification of accounts for gas corporations in the State of Maryland, the classification of accounts for gas corporations recommended by the National Association of Railroad and Utilities Commissioners, with the changes therein and the modifications thereof which have been made by the Commission and included in the classification hereby adopted, a copy of which said classification as adopted is filed herewith.

"(2) That the aforesaid uniform classification of accounts for gas corporations shall become effective on January 1, 1930, and shall supersede the regulations prescribing a uniform system of accounts adopted by the Commission by its said Order No. 302, entered June 12, 1911.

"(3) That on and after January 1, 1930, every gas corporation doing business in the State of Maryland shall keep upon its books the accounts prescribed or defined in the said classification adopted by the Commission by paragraph (1) of this order, so far as the said accounts are pertinent to such corporation.

"AND IT IS FURTHER ORDERED: That a copy of this order and a copy of the classification hereby adopted be forthwith served on each and every corporation affected thereby."

J. FRANK HARPER,
HAROLD E. WEST,
STEUART PURCELL,
Commissioners.

Is a Nation-Wide Uniform Gas Standard Desirable?

THE following is quoted from the July 11, 1929, issue of **Public Utilities Fortnightly**:

"The other day a suggestion was made to us by a manufacturer of gas appliances. Would a nation-wide uniform heating standard for domestic gas service be a good thing? He said that the various standards set by the different state commissions running all the way from 450 B.t.u. per cubic foot in Illinois to 600 B.t.u. in New Jersey were beginning to hamper the appliance manufacturer. Up to the present time gas appliances have usually been so adjustable that this variation made little difference to the manufacturer, but he was of the opinion that the uses to which domestic gas will be put in the future, according to the claims of some of our promising inventors, will give the appliance men a new problem; namely, to overcome the variations in the heating value of artificial gas in domestic service. Our friend did not see why this situation should exist. He thought that now would be a good time to start agitating for uniform standards.

"This suggestion gave us something to think about. We have always been the friend of uniform laws wherever such legislation is feasible. We deplore the needless conflict of legislation between the states on relatively unimportant points concerning really important matters. But we are not sure that uniform gas standards are feasible.

"In the first place, such a standard could not be applied to natural gas; in the second place, it could never be applied to mixed gas; and in the third place, if it is ever applied to artificial gas throughout the country there is bound to be a violent protest from the soft coal regions, from regions where it is still used for light, and from other localities.

"The furnishing of gas has changed a great deal in the last few years. Back in 1916, Commissioner Shaw of Illinois pointed out that the candlepower standard was more or less an obsolete criterion and that the heat-unit measure would be a fairer standard. He said:

" 'Very few bare gas flames are now burned by consumers. The average gas consumer now realizes that it is far more economical to take advantage of the savings in gas bills resulting from the use of incandescent burners that utilize the heat content of the gas. High candlepower in gas is procured only by the injection of an oil spray during the process of manufacture. Due to the recent marked increase in the price of petroleum products, oil for gas-making purposes is growing more and more expensive.'

"And then a few other factors must be considered in determining the proper standards. The same Illinois Commission in 1928 allowed a reduction on the B.t.u. content of a supply of gas to encourage the use of coal mined within the state which was unfit to produce gas of a higher value or the usual by-products of other classes of coal, where great economies of production in distribution could thereby be effected and the general service would not be impaired, where increased rates would be necessary if a higher standard were applied.

"The Commission, however, refused to set a state-wide standard, stating:

" 'On the other hand, due to the fact that operating conditions in different plants are different, it is equally unwise for this Commission to take the position that there should be no variations from the rule as established. . . . The location of the plant is material, as, for example, a plant which can use Illinois coal equally as well as coal from West Virginia may be in position because of freight rate situations to save money by the use of Illinois coal, whereas another might not be in this position.'

"The Washington Commission has said that the maintenance of a uniform standard heating value for gas throughout the limits of the entire state was not ordinarily possible or economical. And so, while we have always been strong for uniform laws, as a general principle, we are not sure that this is a proper subject for such legislation. The gas business has changed from a lighting business to a heating business. Even those customers who still use gas for illumination employ superheated gas mantles which depend more on the thermal units than candlepower.

"Some years ago when people first began to consider seriously electricity for illumination, there was a foolish scramble to dispose of gas securities. Many predictions of doom for the gas industry were heard. That industry today is in the finest condition of its existence with a promising future before it. The gas men are just beginning to experiment seriously. Many new gas appliances have been placed on the market—many more are now being created or will be created in the inventors' laboratories. Is it wise, at this time, to tie up such a fair prospect with a rigid and inflexible heating standard even if it were made nationally uniform? We wonder what other gas men have to say about this."

North Shore Co. Issues Booklet on House Heating

THE North Shore Gas Co., Chicago, Ill., has just issued an attractive booklet entitled, "Gas Heat for Homes of Every Size." The booklet contains a brief outline of the advantages of gas fuel for house heating purposes, and then shows pictures of homes in the company's territory which are heated with gas.

In the booklet there is a minimum of discussion on the general advantages of gas for house heating, and a maximum of information on installations already in service.

Fall River Blue Star Home

(Continued from page 482)

In addition to the direct results of the Blue Star home activity as measured in sales and prospects secured through the exhibit, certain indirect results were perhaps even more important. At least 10,000 people in Fall River now know how comfortable, how convenient, and how livable Blue Star homes are. These 10,000 people were impressed by the complete service that is available in the home equipped with gas appliances. A great number of them realized for the first time what the possibilities are for utilizing the basement in a gas-equipped home. Many saw demonstrated to best advantage in their natural surroundings the newer and more unusual gas appliances such as gas refrigerators, incinerators, and laundry equipment.

This exhibit, the second annual Blue Star home exhibit held in Fall River, was an excellent example of what can be done through cooperation of interested parties. Everyone who participated in the exhibit was pleased with the results. Certainly, the Fall River Gas Works Co., which, perhaps, had more to gain than other participants, was more than satisfied.

Publicity and Advertising Section

E. FRANK GARDINER, Chairman JAMES M. BENNETT, Vice-Chairman

What Is This Thing Called Advertising?

By HENRY OBERMEYER

This is the second part of an article on Advertising. Part I appeared in the July issue.

YOU will find that some mediums are inappropriate for the gas company. Some may be used for a particular purpose at a particular time, such as the use we made of more than four million match folders distributed through the United Cigar stores and other agencies last summer at the time when we inaugurated our newspaper advertising campaign on gas refrigeration; and the use of our correspondence stickers drawing attention to the smoke evil at the present time when there is so much talk about this subject.

Other mediums may be made part of a continuing program. Among these, in addition to newspaper and direct mail advertising, we have the very important medium of window displays and posters for use on display floors and delivery trucks. Window displays are possibly more permanent than any other medium, since we shall always want to appear at our best when our customers come to call. As used in this company, window display advertising is a more active medium than this, however, and we have reason to believe that our attractive windows, under the direction of Ray M. Martin, have done much to lure prospects into a closer examination of our appliances. In our window displays we can achieve the purpose of selling an idea, as well as suggesting the appliance to carry out the idea of service, comfort, and convenience which is illustrated therein.

Closely related to window displays is the matter of public expositions, particularly those designed to attract a special class of customers whom the company wishes to interest in a particular idea. Thus we have the hotel show, at which large volume cooking and related appliances are exhibited; the exposition of women's arts and industries, at which our home service division demonstrates household and kitchen equipment as well as its own services in holding cooking classes and advising customers with relation to their household problems; the architect's show, in which matters of insulation, house piping, etc. are featured; the power show, where industrial appliances are shown, and the parents' exposition, where we are able to demonstrate the service of gas in creating better and more efficient homes.

It would seem as if the functions of the advertising department were pretty well scattered over a number of somewhat unrelated activities. This is not the case, however, when you regard advertising simply as a necessary tool which is useful for a multiplicity of purposes. The tool, itself, is organization, and its makeup must be just as well established and scientifically operated as any other department of the business.

Its art and practice, that is to say the way in which it is used, consists of a well-developed technique applying more or less fixed principles according to well-known laws of psychology and physical limitations. Its variety lies in the uses to which it is put, just as a hammer may be used to build anything from a radio cabinet to a warehouse. The hammer drives the nail, while the function of advertising is to publicise.

Its application to the sales department is obvious, but it can also be of assistance to practically every other department of the company: Helping the commercial department to speed up the payment of bills; the manufacturing departments by lending its aid to the sale of coke and other by-products; by aiding in various ways to attract the most desirable type of young engineer-

Mr. Obermeyer is assistant to the vice-president of the Consolidated Gas Company of New York, N. Y.

The Direct Line to Greater Profits
GAS REFRIGERATION
GAS HEATING
CONSOLIDATED GAS COMPANY OF NEW YORK
130 East 15th Street
GEO. B. CORTELYOU, President
Tel. STUyvesant 4900
1823—More than 100 years of uninterrupted public service—1928

Advertisement directed to plumbers

ing talent to the company; and by stimulating the interest of the public, particularly in schools, in the technical development of the industry. It can assist in forestalling certain types of complaints through the spreading of needed information and by warning the ignorant and malicious of the consequences of tampering with meters, mains, and service pipes. It can assist the utilization and shop departments by issuing safety advice and by giving publicity to inspection services and matters of policy affecting the installation and upkeep of appliances in use.

Other illustrations could be given, but this is enough to show that advertising need not only be confined to its merchandising aspects. Publicity, through all sorts of mediums, will always be available and will always be required to some degree as a proper department of gas service to the public.

Those, and there are many of them, who look at advertising as a pleasant occupation devoted to the manufacture of "wise-cracking" slogans, are very much like those who like to ask the gas employee: "How can an intelligent man spend his life working and thinking about such a smelly old thing as gas?"

These same people ask the advertising man how he can spend his life thinking about such prosaic objects as gas ranges, water heaters, and boilers. The reason, as at least one advertising man has described it, is that gas appliances, as well as gas itself, are symbols, shadows, and ideas which lie at the base of all human activities. Once the things we use in living are grasped imaginatively, what could be a happier business than to spend one's day inviting thoughts about increasing comfort for the family, greater leisure for the housewife, better and greater productivity for the producers of the world's goods, all of which are derived from the sale and use of gas service and its appliances.

If you respond to the emotional content of this conception, you know what advertising means to the advertiser. Neither more nor less, he plays his part in distributing the comforts and conveniences of our modern civilization, together with all the other divisions, departments, and interests of the company.

Lessons from Explosions

(Continued from page 468)

No chances should be taken, to save either time or money.

If any work has been planned with a feature recognized as hazardous and which everyone will "feel glad when it is over," it very probably has been wrongly planned and should be done some other way.

A gas works is the wrong place to do stunts.

The use of either a cutting torch or autogenous welding should be carefully considered and greatly restricted.

History also teaches the obvious necessity of prohibiting smoking, matches, open flames of any kind, and intoxicating liquors where the work involves the handling of any apparatus where gas is present.

Manufacturers Section

H. LEIGH WHITELAW, Chairman F. G. CURFMAN, Vice-Chairman
C. W. BERGHORN, Secretary

More Manufacturers Plan to Exhibit

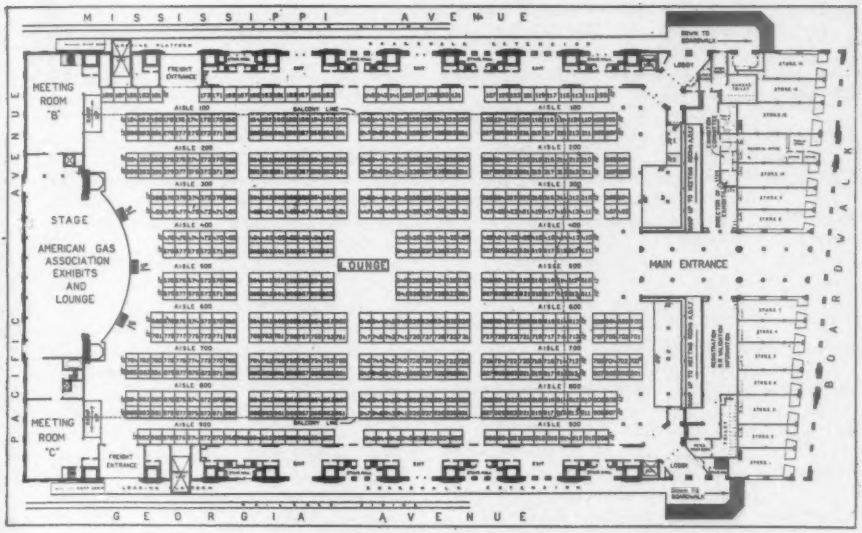
SINCE publication in the July A.G.A. MONTHLY of the list of exhibitors at the eleventh annual American Gas Association convention, to be held at Atlantic City, N. J., October 14-18, many more manufacturers have decided to take space. Inquiries from many more manufacturers are on hand, and additional space allotments will be announced in the September issue.

A striking feature of the 1929 exhibition will be the number of exhibitors occupying more than one or two booths. In previous years, there has not been enough available space for all manufacturers, but this year every manufacturer will be able to take as many booths as he requires.

As of July 25, the list of exhibitors and the booth numbers allotted to them are as follows:

Abendroth Bros., Port Chester, N. Y. 314, 316
A–B Stove Co., Battle Creek, Mich. 424, 426; 525, 527
Adams Bros. Mfg. Co., Inc., Pittsburgh, Pa. 216, 218
Air Reduction Sales Co., New York, N. Y. 760, 762
Alpha–Lux Co., Inc., New York, N. Y. .. 524
American Cast Iron Pipe Co., Birmingham, Ala. 764, 865
American Gas Furnace Co., Elizabeth, N. J. 153, 155
American Gas Journal, New York, N. Y. 631
American Gas Products Corp., New York, N. Y. 452, 553
American Heater Corp., St. Louis, Mo.. 311, 313
American Meter Co., New York, N. Y. 672-676; 773-777
American Radiator Co., New York, N. Y. 754-758
American Stove Co., St. Louis, Mo. 256, 258; 357, 359
Armstrong Cork & Insulation Co., Lancaster, Pa. 417, 419
Automatic Gas-Steam Radiator Co., Pittsburgh, Pa. 337
Apex Electrical Mfg. Co., Cleveland, O. 163, 165
Bailey Meter Co., Cleveland, O. 724
Barber–Greene Co., Aurora, Ill. 564
Barstow Stove Co., Providence, R. I. 134
Bartlett & Snow Co., The C. O., Cleveland, Ohio 655, 657
Bartlett Hayward Co., The, Baltimore, Md. 740-746
Beckwith Co., The, Dowagiac, Mich. 206, 307
Bernitz Furnace Appliance Co., Boston, Mass. 626
Bingham & Taylor Co., Buffalo, N. Y. 716
B–Line Boiler Co., Cleveland, O. 475, 477
Blodgett Co., The G. S., Burlington, Vt... 310
Boone County Coal Corp., Philadelphia, Pa. 850
Bristol Co., The, Waterbury, Conn. .. 851, 853
Bryan Steam Corp., Peru, Ind. 340, 342
Bryant Heater & Mfg. Co., The, Cleveland, Ohio 561-565
Burgess Parr Co., Moline, Ill. 721
Burroughs Adding Machine Co., Detroit, Mich. 600-606; 701-707
Byers Co., A. M., Pittsburgh, Pa. 883, 885
Caloric Gas Stove Works, Philadelphia, Pa. 224, 226
Carrier-Lyle Corp., New York, N. Y. 168, 269, 271
Central Alloy Steel Co., Massillon, O. 220
Chambers Mfg. Co., Shelbyville, Ind. 217, 219, 221
Chaplin-Fulton Mfg. Co., The, Pittsburgh, Pa. 556, 558
Chicago Bridge & Iron Works, Chicago, Ill. 755
Clark & Co., Div., Geo. M., Chicago, Ill. 264, 365
Cleanliness Institute, New York, N. Y. 171, 173
Cleveland Gas Burner & Appliance Co., Cleveland, O. 344, 346
Cleveland Gas Meter Co., The, Cleveland, Ohio 637
Cleveland Heater Co., The, Cleveland, Ohio 435, 437
Cleveland Trencher Co., The, Euclid, O. 869, 871, 873
Clow & Sons, James B., Chicago, Ill. 319, 321
Collier Gas Heating Co., Lynn, Mass... 140, 142
Columbia Burner Co., The, Toledo, O. 358, 360
Columbus Heating & Ventilating Co., The, Columbus, O. 150
Connelly Iron Sponge & Governor Co., Long Island City, N. Y. 624
Connersville Blower Co., Connersville, Ind. 576, 578
Consumers Construction Co., New York, N. Y. 636
Counterflo Heater Co., Salt Lake City, Utah 138

Crane Co., Chicago, Ill. . . 824, 826; 925, 927
Cribben & Sexton Co., Chicago, Ill. 468, 470; 569, 571
Crown Stove Works, Chicago, Ill. 421
Cruse-Kemper Co., Ambler, Pa. 673
Cutler-Hammer, Inc., Milwaukee, Wis. 843-847
Dahlquist Sales Corp., So. Boston, Mass. . . 211
Dangler Stove Co., Div., Cleveland, Ohio 252, 353
Dearborn Chemical Co., Chicago, Ill. 726, 827
Detroit-Michigan Stove Co., Detroit, Mich. Garland Div. 268, 270; 369, 371
Detroit-Michigan Stove Co., Detroit, Mich. Jewel Div. 423-427
Direct Action Stove Co., Div., Lorain, Ohio 260, 361
Dresser Mfg. Co., S. R., Bradford, Pa. 514-518
Dri-Steam Valve Sales Co., New York, N. Y. 852
Dun-Rite Clock Device Co., New York, N. Y. 443
Duotor Manufacturing Co., Dayton, Ohio . . 312
Economy Governor Co., Anderson, Ind. . . 732
Electric Indicator Corp., Stamford, Conn. 510, 512
Electrical Research Products, Inc., New York, N. Y. 3
Electrolux Servel Corp., New York, N. Y. 178-184; 279-285
Ensign-Reynolds, Inc., New York, N. Y. 479, 481
Eriez Stove & Mfg. Co., Erie, Pa. 420, 422
Estate Stove Co., Hamilton, O. . . 304, 405, 407
Favorite Stove & Range Co., The, Piqua, Ohio 207, 209
Felt & Tarrant Mfg. Co., Chicago, Ill. . . .
Fisher Governor Co., The, Marshalltown, Ia. 634
Floyd-Wells Co., The, Royersford, Pa. 318, 320
Foxboro Co., Inc., The, Foxboro, Mass. 677, 679
Fuller & Warren Co., Troy, N. Y. 322-326
Gas Heat Corporation, New York, N. Y. 125, 127
Gas Machinery Co., The, Cleveland, O. 568, 570
Gas Purifying Materials Co., Long Island City, N. Y. 966
General Ceramics Co., New York, N. Y. 167, 169
General Coal Co., Philadelphia, Pa. 719
General Gas Light Co., Kalamazoo, Mich. 251-265
General Office Equipment Corp, New York, N. Y. 612, 713, 715
Giant Manufacturing Co., Council Bluffs, Ia. 617
Glenwood Range Co., Taunton, Mass. 238-246
Griffin & Co., John J., Philadelphia, Pa. . . 680
Groble Gas Regulator Co., Anderson, Ind. . 846
Guardian Gas Appliance Co., Cleveland, Ohio 137, 139
Harper-Wyman Manufacturing Co., Chicago, Ill. 132
Hays Manufacturing Co., Erie, Pa. 656
Helme & McIlhenny, Philadelphia, Pa. 668
Hoffman Heater Co., The, Louisville, Ky. 323-327
Home Incinerator Co., Milwaukee, Wis. 416, 418
Homestead Heater Co., Newark, N. J. 181-189
Hones, Inc., Charles A., Baldwin, N. Y. . . 136
Hotstream Heater Co., The, Cleveland, Ohio. 230, 232
Humphrey Co. Div., Kalamazoo, Mich. 430-436
Hurley Machine Co., Chicago, Ill. 234
Hush-A-Phone Corp., New York, N. Y. . . . 806
Improved Equipment-Russell Engrg. Corp., New York, N. Y. 868
Independent Stove Co., The, Owosso, Mich. 415
International Business Machines Corp., New York, N. Y. 704, 706; 805, 807
Dayton Scale Co. Div.
International Time Recording Co. Div.
Tabulating Machine Co. Div.
International Combustion Engrg. Corp., New York, N. Y. 572, 574
Combustion Engineering Corp.
Dry Quenching Equipment Corp.
International Coal Carbonization Co.
Lewis Mfg. Co., F. J.
Isbell-Porter Co., Newark, N. J. 669, 671
Johns-Manville, Inc., New York, N. Y. 650-654
Johnson Gas Appliance Co., Cedar Rapids, Ia. 145
Judelson Dryer Corp., Moundsville, W. Va. 227
Kernit Incinerator Co., Ampere, N. J. 431
Kieley & Mueller, Inc., New York, N. Y. 833
Kitson Co., Philadelphia, Pa. 222
Kompak Co., The, New Brunswick, N. J. 445, 447
Koppers Co., The, Pittsburgh, Pa. 660, 662
Lambert Meter Co., Inc., Brooklyn, N. Y. . . 675
Lamneck Co., The W. E., Columbus, O. . . 330
Lattimer Stevens Co., The, Columbus, O. 644, 646
Lattner Mfg. Co., P. M., Cedar Rapids, Ia. 245, 247
Lavino & Co., E. J., Philadelphia, Pa. 642, 743
Lawson Mfg. Co., Pittsburgh, Pa. 332
Linde Air Products Co., The, New York, N. Y. 633, 635
Lindemann & Hoverson Co., A. J., Milwaukee, Wis. 144, 146
Lovekin Water Heater Co., The, Philadelphia, Pa. 557, 559
Majestic Mfg. Co., St. Louis, Mo. 157, 159
Maryland Meter Works, Baltimore, Md. . . 769
McDonald & Co., D., Albany, N. Y. 678, 779
McEverlast, Inc., Los Angeles, Calif. . . 864, 965
McLean Economy Gas Furnace Co., Detroit, Mich. 152
McWane Cast Iron Pipe Co., Birmingham, Ala. 625, 627



Layout of booths for A. G. A. exhibition in Convention Hall, Atlantic City, N. J.

Mears-Kane-Ofeldt, Inc., Philadelphia, Pa. 368, 370
Merco Nordstrom Valve Co., Inc., New York, N. Y..... 659-665
Mettler & Co., Lee B., Los Angeles, Calif. 109, 111
Metric Metal Works, Erie, Pa..... 670, 771
Milwaukee Gas Specialty Co., Milwaukee, Wis..... 519, 521
Mine Safety Appliances Co., Pittsburgh, Pa. 638, 640
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn..... 343-347
Mohawk Asphalt Heater Co., Schenectady, N. Y..... 736, 738
Moore Brothers Co., Joliet, Ill..... 411, 413
Mueller Co., Decatur, Ill..... 611-615
Mueller Furnace Co., L. J., Milwaukee, Wis..... 410, 412
Mulcare Engineering Co., New York, N. Y..... 734
National Cast Iron Pipe Co., Birmingham, Ala..... 319, 321
National Lead Co., New York, N. Y..... 741
National Tube Co., Pittsburgh, Pa..... 530-540
New Process Stove Co., Div., Cleveland, Ohio 262, 363
Ohio Foundry & Mfg. Co., The, Steubenville, O..... 338
Parsons Co., The, Newton, Ia..... 765
Partlow Corp., The, Utica, N. Y..... 378, 380
Patrol Valve Co., Cleveland, O..... 433
Payne Furnace & Supply Co., Inc., Beverly Hills, Calif..... 339, 341
Peerless Heater Co., Boyertown, Pa. 463, 465
Peerless Mfg. Co., The, Louisville, Ky. 233, 235
Peninsular Stove Co., The, Detroit, Mich. 414
Pennsylvania Furnace & Iron Co., Warren, Pa..... 333, 335
Perco-Steril Machine Corp., New York, N. Y..... 280
Permutit Company, The, New York, N. Y. 727
Philfuels Co., Bartlesville, Okla. 830, 832; 931, ... 933
Pitman Co., J. C. & J. F., Boston, Mass... 161
Pittsburgh Coal Co., Pittsburgh, Pa... 842, 844
Pittsburgh Equitable Meter Co., Pittsburgh, Pa..... 614-618
Pittsburg Water Heater Co., Pittsburgh, Pa..... 272-278; 373-379
Pittsburgh Valve, Foundry & Construction Co., Pittsburgh, Pa..... 778
Plibrico Jointless Firebrick Co., Chicago, Ill. 831
Porcelain Enamel & Mfg. Co., Baltimore, Md. 210
Public Service Electric & Gas Co., Newark, N. J..... 4
Quakertown Stove Works, Quakertown, Pa. 243
Quick Meal Stove Co., Div., St. Louis, Mo..... 254, 355
Ray-Glo Corporation, The, Athens, O. 460-464
Raymond Co., F. I., Chicago, Ill..... 141
Regent Stove Co., Detroit, Mich..... 306
Reliable Stove Co., Div., Cleveland, Ohio 250, 351

Remington Rand, Inc., New York, N. Y. 700, 702; 801, 803
Reynolds Gas Regulator Co., Anderson, Ind. 745, 747
Richmond Radiator Co., Philadelphia, Pa. 143
Robbins Publishing Co., New York, N. Y. 620, 622
Roberts & Mander Stove Co., Philadelphia, Pa. 511-517
Roberts Brass Mfg. Co., The, Detroit, Mich. 439, 441
Roberts-Gordon Appliance Corp., Buffalo, N. Y. 130, 231
Robertshaw Thermostat Co., Youngwood, Pa. 454-458
Robins Conveying Belt Co., New York, N. Y. 751, 753
Roots Co., The P. H. & F. M., Connersville, Ind. 658, 759
Roper Corp., Geo. D., Rockford, Ill. 472-478; 573-579
Ruud Manufacturing Co., Pittsburgh, Pa. 531-541
Safety Gas Main Stopper Co., Brooklyn, N. Y. 730
Sands Manufacturing Co., The, Cleveland, Ohio 174, 176; 275, 277
Savory, Inc., Buffalo, N. Y. 162, 164
Selas Co., Philadelphia, Pa. 160
Semet-Solvay Co., New York, N. Y. 723, 725
Sexton Stove Manufacturing Corp., Baltimore, Md. 223, 225
Sherwin Williams Co., The, Cleveland, O. 560
Slattery & Bro., Inc., J. B., Brooklyn, N. Y. 317
Smith Mfg. Co., The A. P., East Orange, N. J. 720
Spencer Thermostat Co., Cambridge, Mass. 555
Sprague Meter Co., The, Bridgeport, Conn. 526
Stacey Bros. Gas Construction Co., The, Cincinnati, O. 639, 641
Stacey Manufacturing Co., The, Cincinnati, Ohio 621, 623
Standard Gas Equipment Corp., New York, N. Y. 350-356; 451-457
Acorn Div.
Oriole Div.
Triplex Div.
Vulcan Div.
Statamatic Instrument & Appliance Co., Hartford, Conn. 562
Steinhorst & Sons, Inc., Emil, Utica, N. Y. 236
Superior Meter Co., Brooklyn, N. Y. 653
Superior Screw & Bolt Co., Cleveland, O. 126
Surface Combustion Co., The, Toledo, O. 372-376
Sweet & Doyle Foundry & Machine Co., Troy, N. Y. 131-135
Tappan Stove Co., The, Mansfield, O. 282, 284; 381-385
Thatcher Co., The, Newark, N. J. 331
Time-O-Stat Controls Co., Elkhart, Ind. 469-473
Tinnerman Stove & Range Co., Cleveland, Ohio 459, 461
Titeflex Metal Hose Co., Newark, N. J. 315
Traza Corp., New York, N. Y. 722
Tufts Meter Works, Nathaniel, Boston, Mass. 781
United Engineers & Constructors, Inc., Philadelphia, Pa. (U. G. I.) 731-739
U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J. 552, 554
Universal Sand Equipment Co., Cleveland, Ohio 768, 770
Utilities Publication Co., Chicago, Ill. 619
Victaulic Company of America, New York, N. Y. 630, 632
Wailes Dove-Hermiston Corp., New York, N. Y. 780-784
Walker & Pratt Mfg. Co., Boston, Mass. 170, 172, 273
Watts Regulator Co., Lawrence, Mass. 158
Welsback Co., Gloucester, N. J. 438, 440
Western Gas Construction Co., The, Fort Wayne, Ind. 664
West Gas Improvement Co. of America, New York, N. Y. 750, 752
Wetherbee-Gunn Co., Evanston, Ill. .. 334, 336
Wilcolator Company, The, Newark, N. J. 362, 364
Wood & Co., R. D., Philadelphia, Pa. 520, 522
Wood Mfg. Co., John, Conshohocken, Pa. 237, 239, 241
Youngstown Pressed Steel Co., The, Warren, O. 523

Tickets for Steel Treaters Show Are Available

THE American Gas Association has a limited number of tickets for the national metal exposition to be held in Cleveland, Ohio, Sept. 9-13. These may be obtained from A.G.A. Headquarters.

The American Gas Association is exhibiting at this exposition.

MR. YOUNG—NOMINATING COMMITTEE

THROUGH an error in publishing the Report of the General Nominating Committee in the July issue of the MONTHLY, the name of P. S. Young, vice-president of The Public Service Electric & Gas Co., Newark, N. J., was not included in the list of nominees for Director of the Association for the ensuing term of two years. Mr. Young is a unanimous nominee of the committee.

Industrial Gas Section

J. P. LEINROTH, Chairman — C. C. KRAUSSE, Vice-Chairman

C. W. BERGHORN, Secretary

An Improved Gas Broiler Is Developed

(Continued from page 458)

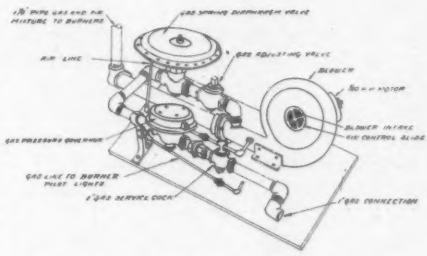
block to the face of the alundum slab. They are manifolded and easily replaced. The broiler is heavily insulated on all sides with mineral wool for heat retention, fuel conservation, and the improvement of working conditions.

Above this oven is another called a finishing oven which is maintained at about 650 deg. F. by the waste heat from below. This broiler is equipped with a raising and lowering grid controlled by an outside handle. Under this grid and fastened to it is a sloping apron which catches the grease when the grid is pulled out of the oven and causes it to run onto a drain which serves as the bottom of the broiling compartment. This drain slopes from all sides to the center where is located a four-inch hole through which the grease runs into a removable drawer just below. As no soapy water is required, this grease can be used again.

It is interesting to note that the broiler is also being made in monel metal finish—in keeping with the modern trend in hotel and restaurant kitchens.

One of these new broilers has been in daily use in the laboratory for more than two years. Supplementing the laboratory tests, field tests on more than 25 of these broilers have been conducted at some of the largest hotels in the country for more than a year and under the severest conditions. The broilers have proved more than satisfactory and the burners show no deterioration whatever.

One installation was made in the Roosevelt Hotel, New York, more than a year ago, and Roger Cretaux, chef-steward, writes "Since March, 1928, your broiler has been in constant service from 6 A.M. until the following 2 A.M., or 22 hours every day. We have never had a bit of trouble or the least cause for repair since installation, even the small motor attached, which we had forgotten about, has functioned without attention.



Sketch of power unit for radiant surface broiler

Our cooks are well pleased with your service broiler and I am personally glad to recommend it as efficient in every respect."

Following the receipt of this letter one of the burners was removed and broken for cross sectional examination and no deterioration was observable.

A few of the other places where this broiler is being used include:

Miller Brothers Restaurant, Baltimore, Md.
Oriole Cafeteria, Baltimore, Md.
Syracuse Hotel, Syracuse, N. Y.
N. Y. Life Insurance Co., New York, N. Y.
Savarin Restaurant, 26th Street and Fourth Avenue, New York, N. Y.
Cafe Savarin, 120 Broadway, New York, N. Y.
Woolleys Restaurant, 140 Fulton St., New York, N. Y.
Congress Hotel, Chicago, Ill.
Chateau Laurier, Ottawa, Canada.

Southwest Division Committee Plans Meeting

ANNOUNCEMENT has been made that a meeting of the Committee on Uniform Classification of Accounts for Natural Gas Companies, Southwest Division, Natural Gas Department, A. G. A., will be held in Dallas, Texas, on August 23.

The first meeting of this committee was held in Kansas City, Mo., in May. E. N. Watkins is chairman.

Salesmen's Compensation

(Continued from page 479)

tremendous industry, evening calls, and the saving of every cent possible on installation costs, delivery expenses, etc. The salesman can save many dollars per month by extreme care in estimating piping costs, in routing his orders, and in being a good trader. It is apparent that a much higher percentage can be paid upon gross merchandise profits than could be paid upon gross merchandise sales; also that much higher percentages can be paid the salesman whose commissions are charged against a drawing account from a zero base than could be paid upon a salary-plus basis.

We are paying gross profit commissions running as high as 40 per cent which means that the salesman shares with the company in the effects of his dealings upon gross merchandise profits and losses, upon a 40-60 basis. Putting him into partnership with the company upon such a high percentage basis sharpens his trading effectiveness immensely. At the same time all appliances and installations are sold upon fixed standard prices and schedules, additional volume through reducing selling prices being sought.

Our gas-revenue commissions are based upon the increased-annual-revenue-value of each piece of equipment and vary from as low as one per cent on poor-load-factor, low-sales-resistance, or dump-rate contracts to as high as 50 per cent in certain instances of off-peak, high-yield, high-sales-resistance orders.

A five per cent commission is paid on all cash collections turned in as down-payments in advance of the execution of the orders.

The accounting in connection with this method has not proved difficult. Commissions are not computed on each sale, but all items are merely listed in a commission ledger and the percentages are computed on the totals for each salesman at the end of each month.

We are much indebted to the gas associations of the country and the many splendid papers and discussions on salesmen's compensation through which the pooled experience of the industry is available to all who care to study. Our present Denver salesmen's compensation plan has apparently yielded splendid results during the past 17 months, but already we are foreseeing certain desirable changes in various details of its application. We desire to avail ourselves of the experiences of other gas sales organizations, and to discard the old for the new as better methods are developed.

Pacific Coast Gas Association

(Continued from page 488)

Hotel Del Monte lies about 140 miles south of San Francisco, and its surroundings are of interest both scenically and historically. It was from here the expedition started which discovered San Francisco Bay and it was here one of the old missions was founded, and still exists, by Fra Junipero Serra, that famous Franciscan monk who now lies buried there. Nearby Monterey was the capitol of the Bear Republic and the first capitol of the state of California.

Convention arrangements will be under the general supervision of C. H. Dickey, president of the Pacific Coast Gas Association, and well-known to the industry throughout the country. His son, W. D. Dickey, will be chairman of the convention arrangements.

The program, while not fully arranged, will consist of parallel sessions of four major sections of the Association, at which time all problems of interest to the Pacific Coast gas industry will be thoroughly discussed. One feature of the program will occur on the morning of Wednesday, September 11, when the convention will listen to a talk on gas refrigeration which will be given over the Pacific Coast network of the National Broadcasting Company. This talk is one of a series of radio talks being sponsored by the Pacific Coast Gas Association as a part of its cooperative advertising campaign.

Another feature of the convention will be two three-minute speaking contests, one for men and one for women, the finals of which will be run off at luncheons on Wednesday and Thursday.

Thursday night will be public relations stunt night in which five companies have entered playlets and stunts in competition for a trophy offered by Addision B. Day, president of the Los Angeles Gas and Electric Corp.

The winners of the Association's essay contest will be announced before the convention, the first prize in this competition being a trip to the convention financed by the company employing the winner.

The Association this year has 50 committees, and it is now contemplated that the general program will consist of discussion of the most interesting and valuable reports.

Commercial Section

G. M. KARSHNER, Chairman — J. W. WEST, Jr., Secretary — G. E. WHITWELL, Vice-Chairman

Miss Deane Dowell Resigns as A. G. A. Home Service Counsellor

Miss Dowell

ANNOUNCEMENT has been made by American Gas Association Headquarters of the resignation of Miss A. Deane Dowell as home service counsellor for the Association. She has retired to private life as Mrs. Robert A. Sovik, of Lynn, Mass.

Miss Dowell joined the staff of the A. G. A. three years ago, and under her capable direction home service work has been stimulated and coordinated. The number of gas companies with home service departments has grown considerably in this time, and in addition to this the activities of the Home Service Committee of the Association have been broadened.

It has also been during the past three years that the annual summer course for home service workers was started at Teachers College, Columbia University, New York, N. Y. The idea of educational courses was further strengthened this year with the establishment of the short course for home service at the Testing Laboratory of the A. G. A. at Cleveland, Ohio.

"Miss Dowell's services have aided greatly in stimulating interest in home service activities," Oscar H. Fogg, President of the Association, said in announcing the resignation.

"We regret that Miss Dowell is retiring to private life, but we are sure that she is leaving behind her a record of achievement," he stated.

Miss Jessie McQueen Is Chosen Home Service Counsellor

THE appointment of Miss Jessie McQueen as home service counsellor for the American Gas Association has been announced by Alexander Forward, managing director of the Association. Miss McQueen, who has been connected with Montana State College for some years, joins the Association headquarters staff in New York on August 1.

Miss McQueen

Miss McQueen succeeds Miss A. Deane Dowell, who resigned recently.

Miss McQueen is a graduate of Albert Lea College, at Albert Lea, Minn., and of the College of Agriculture, at St. Paul, Minn. She has also received an A.M. degree from Teacher's College, Columbia University, New York, N. Y., and for the past few years has been foods and nutrition specialist of the Montana Extension Service, Montana State College, Bozeman, Mont.

In announcing the appointment of Miss McQueen, Mr. Forward said that he was sure she would carry on the splendid work which had been inaugurated by Miss Dowell.

"While we will feel the loss of Miss Dowell's services keenly, I am sure that Miss McQueen will do a great deal for home service work," he said. "Through Miss McQueen we will continue to offer home service advice and counsel, as we have in the past."

35 Attend Laboratory Home Service Course

THIRTY-FIVE home service workers, service men, and salesmen, coming from San Antonio, Texas, to Ottawa, Canada, and from Milwaukee, Wis., to Roanoke, Va., attended the first course in domestic gas appliances given by the American Gas Association at its Testing Laboratory in Cleveland, Ohio. The course was held from June 24 to 29, and was sponsored by the Association's Home Service Committee, of which Mrs. Luella Fisher, home service director of the Eriez Stove & Mfg. Co., is chairman.

The instruction was under the direct supervision of a subcommittee composed of Miss Dorothy Shank, director, research kitchen, American Stove Company, Lyle F. Turner, Cleveland agent, East Ohio Gas Co., and George B. Shawn, supervisor, Testing Laboratory. Mr. Shawn was directly in charge of the instruction.

The course was designed to make its members more intimately acquainted with the various types of domestic gas appliances, so that they might be in a better position to explain the operation and care of them to the user, and properly make appliance adjustments if necessary. Consequently, the theory, construction, adjustment, repair, and installation of various types of appliances were thoroughly discussed.

Lectures on appliances were given by members of the Testing Laboratory staff who have had special experience in each type. Fred A. Allen, testing engineer of the range testing section, discussed different styles of ranges and thermostat and burner adjustments. W. P. Cook, of the space heater testing section, lectured on the design, adjustment, and installation of radiant heaters, circulators, gas-fired steam and hot water radiators, and reflectors. Types of water heaters, their use and care, and the operation and adjustment of automatic devices used on them were covered by Norman J. Reiff, of the water heater section. C. S. Stuckenholt, of the central house heating appliance testing section, discussed various types of boilers and furnaces, illustrated the types of controls used, and demonstrated their proper application. Miscellaneous appliances, including refrigerators, clothes dryers, and incinerators, were made the subject of a talk by J. Donald Kroeker, who discussed their importance, operation, and care.

Effects on appliances of varying gas service conditions were demonstrated to the class by Mr. Shawn, who showed also how appliances could be adapted to such conditions. A discussion of the effect of ventilation and chimney conditions on the operation of appliances and the atmosphere of living quarters was also given by Mr. Shawn.

Lectures of a more general nature included an address of welcome by R. W. Gallagher, President, East Ohio Gas Company, a discussion of the use of gas ranges

(Continued on page 510)

Technical Section

HARRY E. BATES, Chairman B. V. PFEIFFER, Vice-Chairman
H. W. HARTMAN, Secretary

Using Well Water to Prevent Freezing

By WILLIAM LAWTON, JR.

DURING the fall of 1928 it was decided to make a change in the method to prevent the water from freezing in the cups at one of our district holders.

This is a four lift holder with a capacity of two million cubic feet. Up to this time we were running a low-pressure boiler feeding system directly into the cups through the necessary pipes and nozzles. This method was very unsatisfactory as we lost much steam on account of leaking joints and during severe weather ice would form in the cups at the northern exposure and cause considerable expense.

We decided to replace the piping to the holder and pump well water directly into the cups. We replaced the old circulating pipes with 1½″ galvanized steel pipe with ¼″ outlets discharging 2″ below the surface of the water in the cups. The circulating pipe did not go completely around the cups and we left a gap of about 75 feet. In this method of construction we place 10¼″ outlets in each cup as we considered the surface of the well water, although exposed, would not freeze on account of the fourth section being more or less in constant motion.

During the month of January we had the coldest temperature that we have had for a number of years. The thermometer registered 12 degrees above zero and the well water registered 44 degrees above zero. We pumped this water into the cups and this is the first time in a number of years that ice did not form in the cups. We were pumping 75 gallons per minute against a pressure of 70 pounds per square inch. I firmly believe the pumping rate can be cut back to 50 gallons per minute which will consequently reduce the pressure head at the same time. The suction to the centrifugal pump is siphoned from the well with a pipe 3″ in diameter and the discharge is 2″ in diameter from which three vertical pipes 2″ in diameter rise to take care of the various cups. The connection from the riser pipe to the circulating pipe is through 1½″ hose, the circulating pipe is 1¼″ in diameter and the outlets are ¼″ in diameter. The same amount of water is pumped into the three cups by manipulating the control valve on each riser pipe.

The total cost of this installation, including labor, pump and material was $904.46.

Mr. Lawton is engineer of gas distribution, Richmond, Va.

Status of House Heating

(Continued from page 464)

In many large cities serving manufactured gas, as much as seven to ten per cent of the total yearly gas output is now being sold for central house heating plants, including residential, commercial, and industrial buildings.

Gas house heating has played a prominent part in the new competition in the heating field—that is, the competition between solid fuels and completely automatic, semi-automatic and non-automatic heat. But it has done more than that. It has set the pace for better, cleaner basements, and it also has set the pace in building construction that has opened the field for wall and ceiling insulation. These two factors materially have affected architecture. There are many other basic living conditions affected. For instance, all materials used in gas making are delivered by boat or train and all gas is delivered noiselessly underground. There are no ashes to remove. Who can tell how great the benefits to traffic relief will be from these facts when 25 per cent or 30 per cent of the houses in congested cities are heated with gas?

Simplified Apparatus

(Continued from page 474)

were used. This gas was obtained from cylinders purchased from manufacturers of ethylene for dental purposes. It analyzed 100 per cent illuminants. When both chromic acid towers were maintained at room temperature, ethylene was practically completely oxidized by iodine pentoxide at 150° C. The following table indicates the results obtained:

Chromic Acid at Room Temperature		Chromic Acid at 100° C.	
% Ethylene in Sample	% Indicated CO Obtained	% Ethylene in Sample	% Indicated CO Obtained
.0428	.0414	.0862	.015
.1068	.1550	.1735	.0035
1.930	5.070	.253	.0156

When the first chromic acid tower is heated to 100° C. and the second maintained at room temperature, a large percentage of the ethylene is oxidized or absorbed by chromic acid and the indicated percentage of carbon monoxide is very low as shown in the above table. These results indicate that if ethylene is present in combustion products, it is oxidized by iodine pentoxide and the carbon monoxide results obtained are not exact where the chromic acid is maintained at room temperature. If, however, the chromic acid is heated most of the ethylene does not reach the iodine pentoxide. The effect of ethylene on iodine pentoxide is substantiated by Gautier[10] who states that ethylene, acetylene, vapors of benzene, and alcohol are oxidized partially by iodine pentoxide.

Oxygen: Oxygen in concentrations which may be obtained in products of combustion or fuel gas has no effect on iodine pentoxide. This is known because 20.93 per cent oxygen in air gives no reaction.

Hydrogen: Hydrogen was prepared by the action of sulphuric acid on zinc. The gas as prepared analyzed 4.8 per cent oxygen, 25.6 per cent nitrogen, and 69.6 per cent hydrogen. When percentages varying from .05 per cent to .337 per cent were mixed with nitrogen, no reaction whatever was obtained with iodine pentoxide.

[10] A. Gautier, *Jour. Gas Ltg.*, 121, 547.

Methane and Ethane: For the purpose of these experiments, natural gas containing 80.5 per cent methane, 18.2 per cent ethane, and 1.3 per cent nitrogen was used. Amounts varying from .057 per cent to .428 per cent natural gas mixed with nitrogen gave no reaction when passed through the apparatus.

Hydrogen Sulphide: No reaction was obtained with hydrogen sulphide present in percentages as great as 1.435 per cent. This gas was prepared in the usual manner by dropping hydrochloric acid on ferrous sulphide.

Sulphur Dioxide: When as much as 3.02 per cent sulphur dioxide in nitrogen was passed through the apparatus, no indication of a reaction with iodine pentoxide was obtained. A known amount of iodine was added to the potassium iodide solution and no interference in obtaining a satisfactory end point in the titration was observed. The sulphur dioxide was prepared by dropping sulphuric acid on sodium sulphite.

Water Vapor: The apparatus is designed to absorb all moisture before the sample reaches the iodine pentoxide, but for the purpose of this determination one-tenth cu.ft. of nitrogen saturated with water vapor was passed directly into the iodine pentoxide. An indicated amount of .003 per cent carbon monoxide was obtained. No satisfactory explanation of this reaction is given at present.

Formaldehyde: Formaldehyde was prepared by heating "paraform" tablets used for disinfecting purposes. The gas obtained analyzed 27.3 per cent carbon dioxide, 2.8 per cent oxygen, 6.3 per cent hydrogen, 2.8 per cent carbon monoxide, 51.4 per cent aldehydes, and 9.4 per cent inerts. The aldehydes were determined by slow combustion with oxygen. For analysis in the iodine pentoxide apparatus a sample of this gas was used after it had been passed through potas-

sium hydroxide, fuming sulphuric acid, potassium pyrogallate, and the copper oxide furnace.

A sample containing 1.0 per cent of aldehydes mixed with nitrogen gave an indicated percentage of .025 carbon monoxide when passed through an apparatus with the chromic acid at room temperature. Cold chromic acid apparently oxidizes aldehydes only partially. When 0.9 per cent aldehydes mixed with nitrogen was passed through the apparatus having one tower of chromic acid at 100° C., no indication of a reaction with iodine pentoxide was obtained. This experiment would indicate that heated chromic acid oxides aldehydes.

Oxides of Nitrogen: Although there is considerable doubt as to the presence of appreciable quantities of oxides of nitrogen in the products of combustion of gas, there is, of course such a possibility. Oxides of nitrogen, mainly nitric oxide and nitrogen peroxide, were prepared by the action of nitric acid on copper. Quantities varying from .13 per cent to 1.06 per cent oxides of nitrogen mixed with nitrogen were passed through the apparatus. In no case was there any indication of a reaction with iodine pentoxide, nor did this amount of oxides of nitrogen affect the satisfactory titration of a known quantity of iodine.

Conclusions

The iodine pentoxide apparatus developed by the U. S. Bureau of Standards and the A. G. A. Testing Laboratory may be used successfully for routine analysis of carbon monoxide in concentrations as low as .002 per cent in the products of gaseous combustion when:

1. Carbon dioxide, oxygen, hydrogen, methane, ethane, hydrogen sulphide, sulphur dioxide, nitrogen, and oxides of nitrogen are present in small quantities.

2. Formaldehyde is present in less than one per cent if one chromic acid tower is heated to 100° C.

Correct reading cannot be secured where relatively large quantities, .04 to 1.9 per cent, of ethylene are present in the products of combustion.

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Public Utilities Association of West Virginia

SECRETARY A. BLISS McCRUM announces that the executive committee of the Public Utilities Association of West Virginia has fixed the time and place for their twelfth annual convention at Wheeling, West Virginia, Wednesday and Thursday, October 23 and 24, 1929.

A. C. Spurr, vice-president and general manager, Wheeling Traction Co. and President of the Association, will shortly appoint a program committee. This is the first time the meeting of the association has been held in Wheeling. The hotel headquarters for the convention will be announced later.

35 Attend Laboratories Course

(Continued from page 506)

by Miss Dorothy Shank, "Accident Prevention with Gas Appliances," by F. E. Vandaveer, chief chemist of the Testing Laboratory, "The Home Service Worker's Place in the Industry," by R. M. Conner, director, Testing Laboratory, "Merchandising Gas Water Heaters," by J. J. Genthner, Cleveland Heater Co., "Service Relations Between Manufacturer and Gas Company and Dealer," by I. V. Brumbaugh, director, research laboratory, American Stove Co., "What the Home Service Worker Should Know About Approved Appliances," by J. Donald Kroeker, and "Home Service Work in Schools," by Mrs. Flora B. Frey, home service department, East Ohio Gas Company.

A trip through the Reliable Stove Company plant and the enameling division of the American Stove Company was also included in the course.

Story of Big Business

(Continued from page 456)

discontinued at the old address and turned on at the new.

(24) The regulatory body of Illinois—the Illinois Commerce Commission—has rated Chicago gas service as the best in the state—and we strive to keep it at that standard. At the same time we try to show our customers how to utilize gas service to turn housekeeping into home-making.

(25) The home service deparment, featuring Mrs. Anna J. Peterson and her staff, was created seven years ago for the purpose of helping the women of Chicago in everything that pertains to the home. About 10,000 tested recipes are distributed daily; 280,000 persons were reached through lectures last year.

(26) Good gas service means not only the fuel itself but the appliances through which it is used. Unsatisfactory appliances can nullify good gas service. The quality of the gas range used with the service greatly influences the customer's satisfaction with the company. To insure high standards in all appliances offered at the Peoples Gas Stores, a laboratory is maintained for testing them before they are offered for sale.

So far we have considered gas service only in Chicago homes. (27) Volume cooking—the preparation of food in hotels, restaurants, and institutions—required 3,456,000 cubic feet of gas in 1928. This type of customer uses from 50,000 to as high as 2,500,000 cubic feet per month. Eleven large-volume cooking customers each use over 1,000,000 cubic feet monthly.

Gas is also used in Chicago's industries—in factories, shops and foundries. (28) The gas company maintains a complete metallurgical laboratory—one of the best in the country—cooperating with Chicago commercial and industrial enterprises in solving their heat-treating problems. (29—Here follow several pictures showing industrial gas applications.) One Chicago manufacturer used 630,000,000 cubic feet of gas last year—about 1,750,000 a day—equal to the consumption of 21,000 domestic customers. Gas sales to the five largest industrial customers totaled a billion and a quarter cubic feet.

Manufacturers use gas because they recognize these factors: Elimination of fuel storage and handling expense; accurately controlled temperatures, thereby increasing production and reducing spoilage; flexibility in effecting quick and accurate temperature changes; accessibility in that gas can be piped to any part of the plant; an always dependable reserve supply; cleanliness and convenience of gas resulting in better working conditions and improved labor efficiency.

Aside from all this, gas is a smokeless fuel. (30) It is the only fuel that burns without residue, without pollution of the air. Smoke destroys health and wastes money. Chicago has found that smoke is a menace besides being a nuisance.

This picture was taken on a dark day in Chicago—at noon—when we should have had daylight and sunlight—by the *Daily News* which attributed the darkness to smoke, as stated by Professor Cox of the Weather Bureau, and not to fog.

(31) Chicago has started to bring about smoke abatement—our city officials are working to that end. The next move in the abolition of the smoke nuisance must be taken by the individual citizen.

Associations Affiliated with A. G. A.

Canadian Gas Association
Pres.—Kenneth L. Dawson, Nova Scotia Light & Power Co., Ltd., Halifax, N. S.
Sec.-Tr.—G. W. Allen, 21 Astley Avenue, Toronto.
Conv., 1930.

Colorado Utilities Association
Pres.—H. S. Robertson, Denver Tramway Corp., Denver, Colo.
Sec.-Tr.—O. A. Weller, Public Service Co. of Colo., Denver, Colo.
Conv., Sept. 2, 3 & 4, 1929. Hotel Colorado, Glenwood Springs, Colo.

Empire State Gas and Electric Association
Pres.—Chas. S. Ruffner, Mohawk Hudson Power Corp., Albany, N. Y.
Chairman Gas Section—R. Van Vliet, New York & Richmond Gas Co., Staten Island, N. Y.
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.
Conv., Sept. 19 & 20, 1929, Saranac Inn, N. Y.

Illinois Gas Association
Pres.—E. E. Lungren, Western United Gas & Electric Co., Aurora, Ill.
Sec.-Tr.—George Schwaner, 305 Illinois Mine Workers Bldg., Springfield, Ill.
Conv., 1930.

Indiana Gas Association
Pres.—C. L. Kirk, Citizens Gas Co., Indianapolis, Ind.
Sec.-Tr.—F. W. Budd, Central Indiana Gas Co., Muncie, Ind.
Conv., 1930.

Michigan Gas Association
Pres.—A. I. Snyder, Detroit City Gas Co., Detroit, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.
Conv., 1930.

Mid-West Gas Association
Pres.—E. H. Vieregg, Central Power Co., Grand Island, Nebr.
Sec.-Tr.—Roy B. Searing, Sioux City Gas & Electric Co., Sioux City, Iowa.
Conv., Waterloo, Iowa, Apr. 14-16, 1930.

Missouri Association of Public Utilities
Pres.—T. J. Strickler, Kansas City Gas Co., Kansas City, Mo.
Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.
Conv., 1930.

New England Gas Association
Pres.—J. J. Quinn, Boston Consolidated Gas Co., Quincy, Mass.
Exec. Sec.—C. D. Williams, 41 Mount Vernon St., Boston, Mass.
Chairman Operating Div.—Isaac T. Haddock, Cambridge Gas Light Co., Cambridge, Mass.
Secretary Operating Div.—H. G. Taylor, Lawrence Gas & Electric Co., Lawrence, Mass.
Chairman Sales Div.—J. H. Sumner, Cambridge Gas Light Co., Cambridge, Mass.
Sec.-Tr. Sales Div.—A. M. Slattery, Hoffman Heater Co., Boston, Mass.
Chairman Industrial Div.—L. B. Crossman, Boston Consolidated Gas Co., Boston, Mass.
Sec.-Tr. Industrial Div.—Chas. H. O'Donnell, Boston Consolidated Gas Co., Boston, Mass.
Chairman Acctg. Div.—R. D. Washburn, Massachusetts Lighting Co., Boston, Mass.
Sec.-Treas. Acctg. Div.—Otto Price, Boston Consolidated Gas Co., Boston, Mass.
Chairman Manufacturer Div.—T. H. Piser, Welsbach Co., Boston, Mass.
Sec.-Treas. Manufacturers Div.—J. H. McPherson, 250 Stuart St., Boston, Mass.
Conv., 1930.

New Jersey Gas Association
Pres.—R. A. Koelher, Public Service Electric & Gas Co., Newark, N. J.
Sec.-Tr.—H. E. Cliff, Public Service Electric & Gas Co., Newark, N. J.
Conv., 1930.

Ohio Gas and Oil Men's Association
Pres.—L. K. Langdon, Union Gas & Electric Co., Cincinnati, Ohio.
Sec.-Tr.—Wm. H. Thompson, 811 First National Bank Bldg., Columbus, Ohio.
Conv., 1930.

Oklahoma Utilities Association
Pres.—T. R. Weymouth, Oklahoma Natural Gas Corp., Tulsa, Okla.
Mgr.—E. F. McKay, 1020 Petroleum Bldg., Oklahoma City, Okla.
Conv., 1930.

Pacific Coast Gas Association
Pres.—C. H. Dickey, El Deseo, Del Monte, Calif.
Exec. Sec.—Clifford Johnstone, 447 Sutter St., San Francisco, Calif.
Conv., Sept. 10-13, 1929, at Del Monte, Calif.

Pennsylvania Gas Association
Pres.—W. A. Norris, Lebanon Valley Gas Co., Lebanon, Pa.
Sec.-Tr.—Geo. L. Cullen, Harrisburg Gas Co., Harrisburg, Pa.
Conv., 1930.

Pennsylvania Natural Gas Men's Association
Pres.—George E. Whitwell, Equitable Gas Co., Pittsburgh, Pa.
Sec.-Tr.—B. H. Smyers, Jr., The Philadelphia Co., Pittsburgh, Pa.
Conv., 1930.

Southern Gas Association
Pres.—D. H. Levan, Savannah Gas Co., Savannah, Ga.
Sec.-Tr.—J. P. Connolly, 141 Meeting St., Charleston, S. C.
Conv., 1930.

Southwestern Public Service Association
Pres.—Knox Lee, Southwestern Gas & Electric Co., Marshall, Texas.
Chairman Gas Section—Frank L. Chase, Lone Star Gas Co., Dallas, Texas.
Sec.—E. N. Willis, 403 Slaughter Bldg., Dallas, Texas.
No Convention, 1929.

The Public Utilities Association of Virginia
Pres.—A. W. Higgins, Virginia Public Service Co., Charlottesville, Va.
Sec.—A. B. Tunis, 301 East Grace St., Richmond, Va.
Conv., Nov. 21 & 22, 1929, Chamberlin-Vanderbilt Hotel, Old Point Comfort, Va.

Wisconsin Utilities Association
Pres.—G. W. Van Derzee, The Milwaukee Electric Railway & Light Co., Milwaukee, Wis.
Exec. Sec.—J. N. Cadby, 105 Wells St., Milwaukee, Wis.
Meetings of Sections.

Eleventh Annual Convention of the American Gas Association
Atlantic City, N. J. October 14-18, 1929

Employment Bureau

(Address All Communications to Key Number)

SERVICES REQUIRED

LARGE EASTERN UTILITY wants Sales Engineer (Mechanical or Chemical preferred), 27 to 32 years of age, to sell manufactured gas for heating processes. Knowledge of combustion, furnace design and construction, and modern industrial heating practices desirable. Address A. G. A.
Key No. 0141.

THREE (3) CAPABLE NATURAL GAS HOUSE HEATING SALESMEN—men with a successful record in selling residence furnace conversion units. Fine opportunity for experienced men, possessing real sales ability. Location Southern city of 200,000 population where natural gas has recently been introduced. Salary and commission. In first letter give complete sales record, age and references. Address A. G. A.
Key No. 0144.

HOUSE HEATING SALESMAN—Large Eastern utility has vacancy for a man between 30 and 45 years of age for sales work in the use of gas for house heating. Must be a Technical High School graduate and have at least two years' experience in residence heating. Permanent position. Please state age, experience, education and salary desired. Address A. G. A.
Key No. 0145.

GAS ENGINEERS wanted by public utility in Central Hudson Valley. Ages between 23 and 35 years. One graduate Civil Engineer, one Mechanical Engineer and one Chemical Engineer. Experience desired in construction, operation and maintenance of water gas plants, steel transmission and distribution lines, including services. In replying give age, education, experience and salary desired; also send small kodak picture. Address A. G. A.
Key No. 0146.

GAS ENGINEER: Gas apparatus manufacturing company desires services of technical man; about 30 to 35 years; must be good water gas operator and be able to start up new equipment. Give experience and salary desired. Address A. G. A.
Key No. 0147.

COMMERCIAL GAS ENGINEER required. Familiar large gas installations and appliances and capable supervising meter shop. Location, South America. Applicants should give full particulars, education, experience. References. Address A. G. A.
Key No. 0148.

WANTED—Young college graduates of mechanical or chemical engineering. Positions permanent. Good opportunity for advancement. Address A. G. A.
Key No. 0150.

SERVICES OFFERED

ENGINEER with 7 years' experience in gas and electric utility construction, maintenance, operation and accounting, desires new connection as manager, assistant manager, or superintendent of small utility. New England preferred. Address A. G. A.
Key No. 281.

SALESMAN with wide experience, including sales promotion, desires connection as representative for manufacturer. Acquainted with gas companies and dealers in territory from Boston to Washington. Proposition on agency basis for Eastern territory or Pacific Coast also considered. Address A. G. A.
Key No. 282.

GAS DISTRIBUTION ENGINEER. Also fully acquainted with manufacture and utilization. Understands the necessary methods of handling the public and municipal officials. Ready to serve at once. Will go anywhere, if position is permanent. References will be given by district or city or other local and managing companies. Address A. G. A.
Key No. 284.

GAS ENGINEER, college education, with twelve years' experience, first four with Coal Gas & Electric Co., last eight years as manager of small Water Gas Co., desires position as manager or assistant manager of a gas or combination company. Address A. G. A.
Key No. 285.

ADVERTISING MAN of wide experience, now employed by large public utility, available for position as director of publicity either in same field of work or with manufacturer. Capable of organizing and directing an advertising department, or handling the job unassisted. Age, 35; married; Protestant. Willing to locate anywhere. Ready to entertain further negotiations. Address A. G. A.
Key No. 287.

MANAGER OR GAS DISTRIBUTION SUPT. Man with over 20 years' experience in one company desires position as manager of small property or distribution superintendent. Am experienced in water gas, high and low pressure, and can furnish the best of references from former employers, municipal authorities, etc. Age 43. Address A. G. A.
Key No. 288.

GAS ENGINEER, 45, experienced. Coal and Water Gas Sets, as manager for fair sized plant. Good executive. Address A. G. A.
Key No. 290.

YOUNG LADY with twelve years' experience in coke oven and gas business, desires secretarial position, New York City preferred. Address A. G. A.
Key No. 291.

ADVERTISING MAN, experienced in trade paper, newspaper, direct mail and other forms of advertising, available June 1. Now employed as advertising manager by large public utility. Capable of organizing and directing an advertising department or handling the work unassisted. Age 30, married. Protestant. No objection to location. Address A. G. A.
Key No. 292.

AVAILABLE, a man who has been employed through a continuous period of years in nearly all branches of the gas business. General office to superintendent of manufacture and distribution, including both coal and water gas. Would like to make a similar connection or one of general supervision. Address A. G. A.
Key No. 293

POSITION WANTED—Technical man now employed desires new location. Eight years' experience in distribution and transmission of natural and manufactured gas. Am able to organize and direct large crews. Also experienced in leakage surveys and appraisal work. Address A. G. A.
Key No. 294.

TECHNICAL GRADUATE, twenty years' experience in manufacture of water gas. Age 45, married. Open for position as manager or superintendent. Address A. G. A.
Key No. 295.

WANTED—Position as assistant to engineer of distribution by young man with four and one-half years' experience in Distribution Department of large corporation. 22 years old. Single. Willing to travel. Good references. Address A. G. A.
Key No. 296.

TECHNICAL MAN—Due to merging companies, looking for a position as manager or supt. of small company or in operating department, 15 years' plant work, 2 years in engineering and operating departments; age 41. Address A. G. A.
Key No. 297.

CERTIFIED Public Accountant (N. Y.) five years' gas and electric rate case and accounting experience, university graduate, age 30, immediately available. Address A. G. A.
Key No. 298.

A TECHNICALLY EDUCATED GAS ENGINEER, now employed, with 15 years' experience in Coal and Water Gas Operation, Distribution and Industrial Sales, desires new connection. Address A. G. A.
Key No. 299.

PUBLIC RELATIONS DIRECTOR—The State House and political reporter for one of the large New England newspapers desires connection with a public utility or manufacturing enterprise where his wide experience in publicity, house organs, statistics, business research, governmental and economic conditions will be of value. Ten years all branches newspaper work. Massachusetts Tech and Columbia. Age 29 and married. Has handled many public utility cases and other important newspaper assignments. Excellent recommendation. Address A. G. A.
Key No. 300.

EXPERIENCED APPLIANCE SALESMAN—Man with several years experience selling best known lines of gas heating appliances. Would consider similar position or direction of merchandising department some growing gas utility. Texas, Oklahoma or Kansas preferred, but will go anywhere opportunity offers. Address A. G. A.
Key No. 301.

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AMERICAN GAS ASSOCIATION, INC.

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